The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER JUNE 2008

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

Date and time	Wednesday 25 June at 19h15
Chairperson	Fred Oosthuizen
Beginner's Corner	Johan Smit
What's Up in the Sky?	Michael Poll

++++++++++ LEG BREAK - Library open ++++++++++++

MAIN TALK

"Asteroids"

by

Tim Cooper

The meeting will be followed by tea/coffee and biscuits as usual.
The next observing evening will be held on Friday 20 June at the Pretoria Centre Observatory, which is also situated at CBC. Arrive anytime from 18h30 onwards.

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Last month's meeting — Hein Stoltsz

The meeting was attended by about 40 people including 12 visitors. After a few words of welcome and some announcements, Johan Smit, Pretoria Centre's Vice Chairman and curator of instruments, briefly reported on Scopex and the remarkable achievement of our centre's members. Of the six people that received merit awards, four were Pretoria Centre members! These were: Fred Oosthuizen (Foucault wire tester), Percy Jacobs (optical quality of 10" Dobsonian), Danie Barnardo (optical quality of 6" Dobsonian and observing chair) and Pat Kuhn (workmanship on 6" Dobsonian, tracking platform and observing chair). Congratulations and thanks for doing us proud! This surely will be a hard act to follow in the future at Scopex, but should definitely also serve as motivation for all those budding amateur astronomers with an inkling to build their own!

In Beginner's Corner, Johan Smit tackled the topic of light pollution and the preservation of our dark skies. He clearly illustrated the difference between effective lighting (providing light in or on an area required to be illuminated) and ineffective lighting (excessive lighting shining upwards and which is of no benefit at all). In this regard, bright security lighting provides residents with a false sense of security, but it often fails dismally at providing any added security benefit. In contrast, relatively cheap, properly designed and aimed light fittings can be much more effective and will not only preserve our beautiful night sky for generations to come, but will also save thousands and perhaps millions of Rands in energy costs. With the current electricity shortage experienced in South Africa, it is worth considering that the required electricity saving by its clients to prevent any load-shedding by Escom, could be achieved by such simple measures alone! Johan also made a strong plea to everyone to sensitise others, especially family, friends and colleagues, to the problem of light pollution and to promote these ideas and suggestions to help curb it for the benefit of all.

[The Dark Sky Section of ASSA, under the direction of Cliff Turk at e-mail address **cliffturk@absamail.co.za**, has formed the South African Dark Sky Association (SADSA) with the objective of drawing people's attention to the problems of light pollution. Visit their website for more information:

http://www.saao.ac.za/assa/html/38 darkskysection.html

What's Up for June was presented by Danie Barnardo, who reviewed planet visibility for the month as well as some interesting groupings of the Moon, Saturn and Mars on the 7th, the Moon Uranus and Neptune on the 25th, and Jupiter and the Galilean moons on the 16th and 24th, the latter including a transit of Jupiter by Io.

The main topic of the evening "From the outside, looking in" was presented by Dr Cecil Churms, currently a Senior Research Scientist at De Beers. During his most entertaining and fascinating talk, Cecil shared many anecdotes of his uncle, the late Joe Churms, Assistant Director of SAAO, who amongst other things, discovered two asteroids in 1953 and was the co-discoverer of the rings of Uranus in 1977. Cecil's expertise in Computer-assisted Tomography (or CAT scan) and access to a very powerful X-Ray instrument (usually put to industrial use) of X-tek in Tring, England, was applied to an ancient artefact discovered on an old shipwreck in 1900 of the coast of the island of Antikythera. What appeared to be an unassuming small decorated box, lay hidden in a vault for decades before a someone examined it a bit closer in 1950 and concluded that it was some sort of astronomical calculator, dating from approximately 150 BC. During 2004, under high definition three-dimensional scanning, the true genius of the instrument was revealed. It turned out to be an extremely sophisticated, complex pin-and-gear-operated instrument, which not only predicted the precise positions of the moon, the sun and planets, including solar eclipses in 18 year Saros cycles, but did so for both the southern and northern hemispheres to within an accuracy of 8 hours or less! This is truly a remarkable feat of applied astronomical knowledge and engineering technology even by today's standards, and could not have been appreciated without the aid of the highly sophisticated modern CAT scan technology.

The evening's events were concluded with some informal discussions over a cup of tea or coffee and biscuits.

ASSA Symposium 2008

ASSA Symposium: Durban Country Club, Thursday 7th August to Saturday 9th August, 2008. Professor George Ellis of the University of Cape Town has accepted the invitation as keynote speaker. The Symposium theme is **"Interaction between Astronomy and Cosmology."**

See website **www.astronomydurban.co.za**

Last month's observing evening - by Michael Poll & Danie Barnardo

About 15 of us were there for the observing evening, with a number of newcomers and four telescopes. There were no clouds (!), but the sky got very hazy later on, so that only the brightest stars were visible. However, it was not so bad when we started, so we did get some observing.

We first looked at quite a rare treat – Mars was in the Beehive Cluster (M44) in Cancer. Mars was much brighter than the star background, of course, but only showing a small disc because it was 1.83 astronomical units from us, which is nearly the *diameter* of the Earth's orbit. (When Mars is in conjunction with the sun early in December it will be 2.5 AU from us). In contrast M44 is much further away at 577 light years.

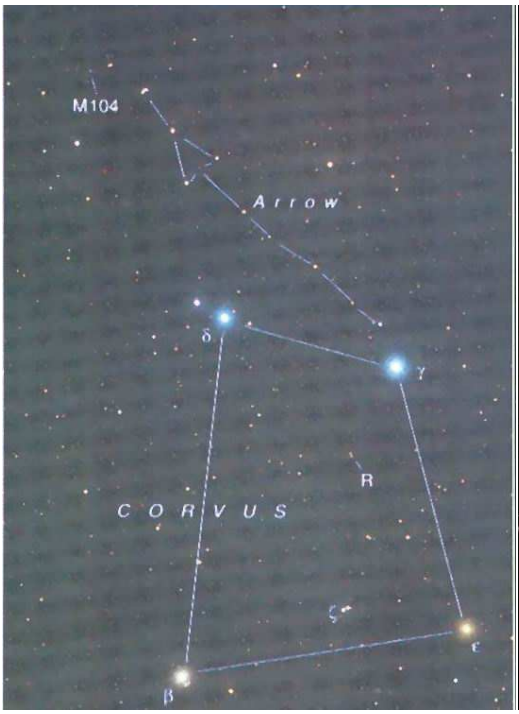
Next was a stream of open clusters in the Milky Way, starting with M41, the only Messier object in Canis Major, which lies about one third of the way from Sirius to delta Canis Majoris (Wezen). East of Sirius (above at the time) was M47 in Puppis. Next to M47, the adjacent cluster, M46, could not be seen. The same applied to another pair of clusters in Puppis – we could see NGC2451 but not NGC2477. Further south were the familiar clusters in the Carina-Crux region, namely IC2602 (Theta Carinae, the Southern Pleiades), NGC3532 and NGC2526 in Carina, and NGC4755, the Jewel Box, in Crux. While in this area we again looked at Alpha Centauri, and a second double star, Alpha Circini, which is near Alpha Centauri.

Some of us had a discussion about the observing double stars, and how the brightness is estimated, and how observations can be reported to the AAVSO. We then looked at S Carinae (near its minimum at the time), R Carinae (near its maximum), and R Centauri (which is in the mid range of its brightness, and is near Beta Centauri).

Later on we tried for some time, unsuccessfully, to find the Sombrero Galaxy, M104, which is on the border of Corvus and Virgo. Our pursuit was defeated by the increasing haze, and the light in the sky of the rising gibbous moon. Low down the red moon was a lovely sight, both visually and telescopically. In the evenings at this time of year one can see the part of the moon that is usually only seen when the moon is in the morning sky. The moon will have drifted out of our observing evening next month.

Another interesting open cluster seen in Vela was NGC2547, which has a distinct heart shape. Nearby is the multiple star system Gamma Velorum in Vela, a star also known as Suhail Al Muhlif and also as Regor. This is one of the show pieces of the southern skies and consists of two bright blue giant stars, of magnitude 1.83 and 4.27 respectively. Despite their distance of approximately 840 light years, they appear relatively bright, hinting at the enormous amount of energy radiated. The system is easily split into its two bright components (even with small telescopes), but unseen is the spectrographic companion of the brightest component. The brightest component is a Wolf-Rayet star and one of the few visible with the naked eye. These stars have more than 64 times the mass of our sun and radiate more than 1.4 million times the energy of our sun. Gamma is an evolved O-type star, which is characterised by a very powerful solar wind and, in the case of a Wolf-Rayet star, this solar wind has blown away the outer layers of the star, exposing its extremely hot helium interior. There are also two fainter companions, forming a T-shape with the two bright companions. These were also seen, they are magnitude 8.2 and 9.1 respectively. Gamma is the brightest star in Vela – Vela has no alpha or beta, they were lost when the constellation of Argo was split up.

See the next page for images related to this report.



These images belong to the report on page 4.

Top left: The position of M104 (the Sombrero Galaxy), on the border of the constellations Corvus (The Crow) and Virgo (The Virgin), is shown near the top left corner of the image.

Top right: M104 as imaged by the Hubble Space Telescope.

Ons het 'n nuwe webwerf!

Die Pretoria Tak van die Sterrekundevereniging van Suidelike Afrika het 'n nuwe webwerf by die ou webwerfadres. Danie Barnardo en Johan Smit, albei komiteelede, het die inisiatief geneem om die nuwe webwerf te laat ontwerp. Hulle sal die inligting daarop in die toekoms opdateer, foute daarin regmaak en nuwe inligting byvoeg. Hulle het reeds opleiding ontvang om dit te doen. Andries Oberholzer, van Noordvandieberg was verantwoordelik vir die nuwe ontwerp.

REMINDER

YOUR MEMBERSHIP MUST BE RENEWED BEFORE 30 JUNE 2008.

Terug maan toe

Vroeg in Desember 2006 het NASA hulle planne bekend gemaak vir die vestiging van 'n permanente basis op die Maan. Die "Global Exploration Strategy" behels 1,000 mense van 14 ruimte instansies wêreldwyd, nieregeringsagentskappe en kommersiële maatskappye wat by die onderneming betrokke sal wees. Die strategie fokus hoofsakelik op twee aspekte: Waarom gaan ons terug Maan-toe en wat word daar beplan wanneer ons daar is. Daar is ook die logistiese kwessie van hoe so 'n onderneming suksesvol uitgevoer kan word. Voorlopig beoog hulle dat dinge trapsgewys sal plaasvind met 'n bemanning van 4 wat verskeie 7 dae missies sal maak tot die verblyfplek en kragbronne gevestig is. As voorbereiding vir togte na Mars word verdere missies van 180 dae elk beplan. Die eerste vlugte na die Maan sal teen 2020 begin.

Sien webwerf

http://www.universetoday.com/2006/12/04/nasa-announces-long-term-plans-for-the-moon/

(Uit: OOG, nuusbrief van die Orion Observasie Groep, Januarie 2007.)

Introduction to Astronomy

Course presented at the Johannesburg Planetarium. They will be repeating their basic **"Introduction to Astronomy"** series on Wednesdays in July, starting July 9th 2008. More info at **www.planetarium.co.za**.

Riddle of the Nebulae Part 3 - Michael Poll

George Willis Ritchey (1864 -1945) designed the 60" and 100" reflectors on Mount Wilson in the late 1890s. The 60 inch started operating in 1908 and the 100 inch in 1917. In 1908, with the 60 inch, Ritchey obtained photos of M31 which showed even more clearly the spiral structure and granulations in the spiral arms which he described as *"great numbers of soft, star like condensations".* This observation did not establish M31 as stellar, however, because

1 Although the spiral had the spectrum of starlight, individual stars were not seen, and some *clouds of gas* in the milky way also give a continuous spectrum – these are reflection nebulae, (identified by Vesto Slipher in 1912), which give the continuous spectrum of reflected starlight. An example of this is the blue gas around the Pleiades.

2 There was what was called a "Zone of Avoidance" in which no spiral galaxies are found within 10° and 40° of the plane of the Milky Way. W e now know that this zone occurs because the galaxies are obscured by the Milky Way itself, but at the end of the 1800s there was an argument that the spirals *belonged* to the Milky Way because the zone of avoidance was caused by a symmetrical arrangement of the spirals in relation to the galactic plane.
In the 9th edition of Encyclopaedia Britannica (1892) Norman Lockyer discussed the zone of avoidance, but he also said "we might be led to regard the nebulae, except only those known to be gaseous, as other sidereal systems outside our own, and so distant as to appear like small cloudlets of stars".

3 Parallax measurements of the Andromeda Nebula had shown it to be within the Milky Way. This result would have been because of the inaccurate measuring of an extremely small angle, but the point is that the distance not known therefore the size was not known.

The size of the Milky Way was determined by Harlow Shapley (1885-1972) in 1917. Shapley measured the distances of globular clusters using the stars known as Cepheid variables, which behave as "standard candles" and found that the globulars form a system, or halo, of 100 000 light years in diameter, which is centred on the centre of the galaxy. This distribution defined the size of our galaxy, and the observations also showed that the sun is not near the centre of Milky Way.

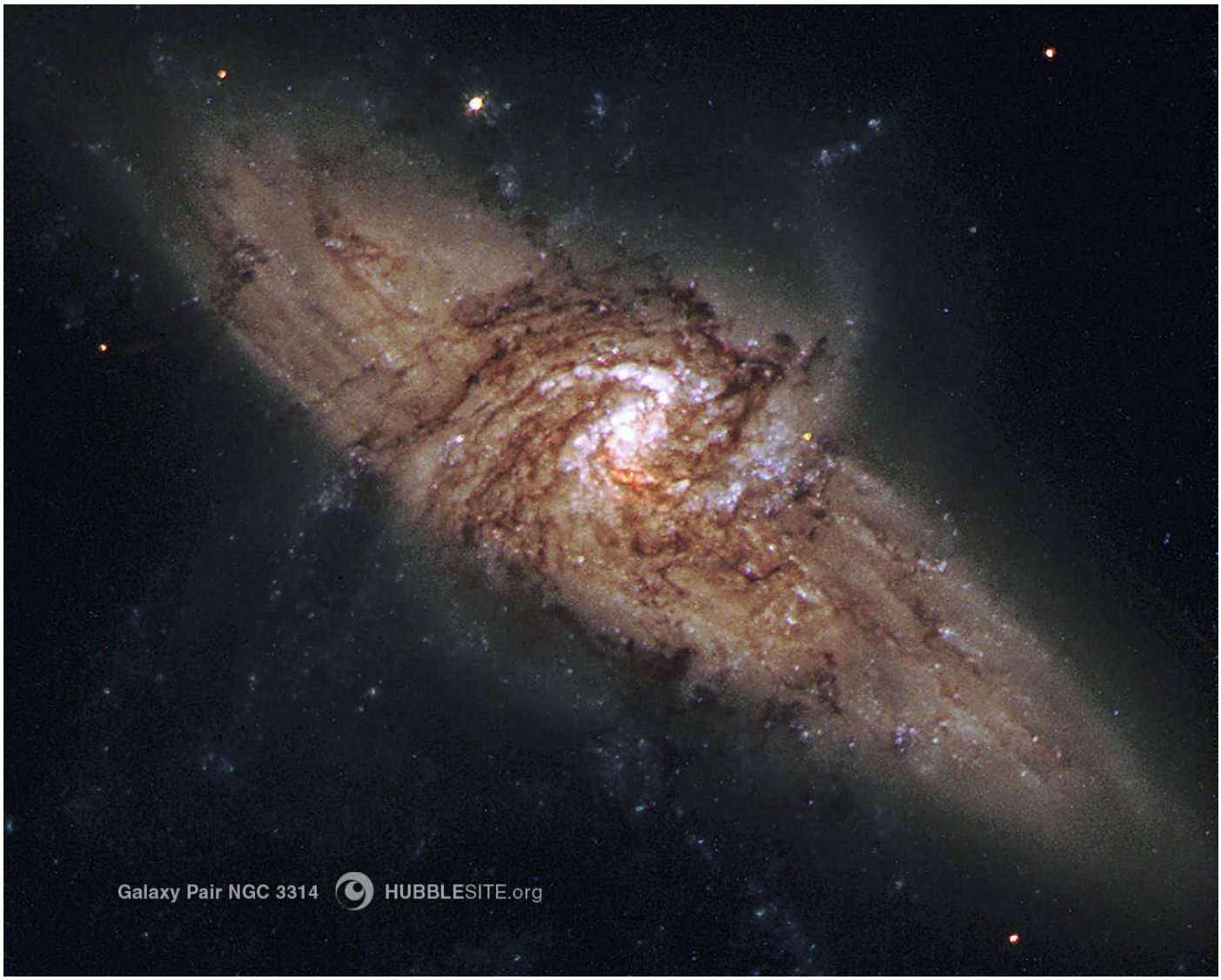
The problem of the white nebulae was not solved until 1923, when Edwin Hubble managed to resolve part of the Andromeda Galaxy into stars, and, again using Cepheid variables as a yardstick, determined a distance of 900 000 light years. The Andromeda Galaxy therefore did not belong to the Milky Way. (In the light of subsequent knowledge and observations, the current distance to Andromeda is given as 2.9 million light years). Hubble introduced the term "Extragalactic Nebulae". We now refer to them as galaxies. The galaxies are not therefore nebulae in the strictest sense. We should confine the word "nebula" to the clouds of gas which are confined to our galaxy.

References include:

Garrett P Serviss "*Curiosities of the Sky"* Harper and Brothers 1909
Lucien Rudeaux & Gerard de Vaucoulers *Larousse Encyclopaedia of Astronomy,* Paul Hamlyn 1962
Sky &Telescope Nov 92 p506
Quotes 9th edition of Encyclopaedia Britannica:(1892)
Sky &Telescope Nov 92 p506

NGC 3314: When Galaxies Overlap

NGC 3314 consists of two large spiral galaxies which just happen to almost exactly line up. The foreground spiral is viewed nearly face-on, its pinwheel shape defined by young bright star clusters. But against the glow of the background galaxy, dark swirling lanes of interstellar dust. are also seen to echo the face-on spiral's structure. The dust lanes are surprisingly pervasive, and this remarkable pair of overlapping galaxies is one of a small number of systems in which absorption of visible light can be used to directly explore the distribution of dust in distant spirals. NGC 3314 is about 140 million light-years away in the constellation Hydra (the Sea Serpent). This colour composite was constructed from Hubble Space Telescope images made in 1999 and 2000. See website **http://apod.nasa.gov/apod/ap050507.htm**l for web links to this topic.



Avalanche on Mars

The image below was taken by the HiRISE* camera aboard NASA's Mars Reconnaissance Orbiter presently orbiting Mars. It shows an avalanche occurring on Mars. The action took place along a stretch of cliff that stands about 700 meters tall and slopes in places by more than 60 degrees. At the top of the cliff (left) are layers of carbon dioxide frost.

Website : **http://news.nationalgeographic.com/news/2008/03/080303-mars-avalanche.html**

*__Hi__gh __R__esolution __I__maging __S__cience __E__xperiment.

Galactic Fossil

How old are the oldest stars? Using ESO's VLT, astronomers recently measured the age of a star located in our Galaxy. The star, a real fossil, is found to be 13.2 billion years old, not very far from the 13.7 billion years age of the Universe. The star, HE 1523-0901, was clearly born at the dawn of time.

"Surprisingly, it is very hard to pin down the age of a star", the lead author of the paper reporting the results, Anna Frebel, explains. "This requires measuring very precisely the abundance of the radioactive elements thorium or uranium, a feat only the largest telescopes such as ESO's VLT can achieve."

Webstie: **http://www.eso.org/public/outreach/press-rel/pr-2007/pr-23-07.html**

Largest known star

The largest known star is VY Canis Majoris; a red hypergiant star in the constellation Canis Major, located about 5,000 light-years from Earth. University of Minnesota professor Roberta Humphreys recently calculated its upper size at more than 2,100 times the size of the Sun. Placed in our Solar System, its surface would extend out past the orbit of Saturn.

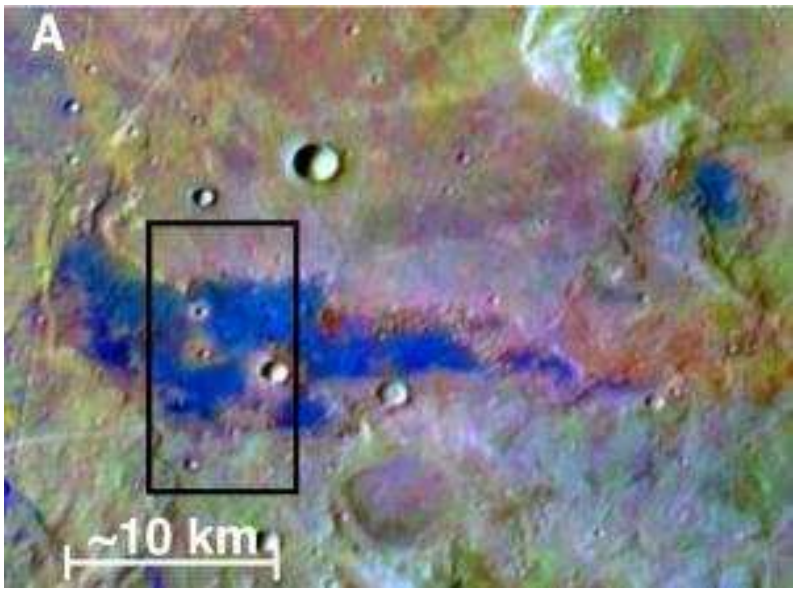
Website:

http://www.universetoday.com/2008/04/06/what-is-the-biggest-star-in-the-universe/

To download her published research paper, go to website

http://arxiv.org/abs/astro-ph?papernum=0610433

Hundreds of Salt Deposits Spotted on Mars



Scientists using a Mars-orbiting camera have discovered the first evidence for deposits of chloride minerals - salts - in numerous places on Mars. These deposits, say the scientists, show where water was once abundant. These are new places to hunt for traces of life on Mars.

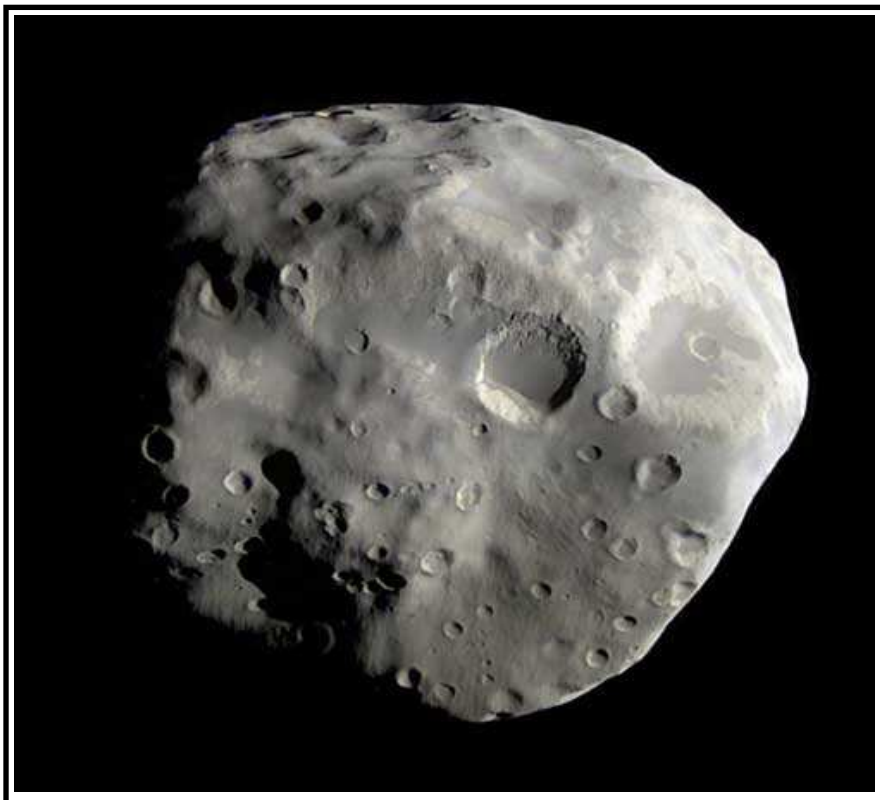
The scientists found about 200 individual places in the Martian southern hemisphere that show spectral characteristics consistent with chloride minerals. These salt deposits occur in the middle to low latitudes all around the planet within ancient, heavily cratered terrain. The deposits range in area from about one square kilometer to about 25 square kilometers. Many of the deposits lie in basins with channels leading into them. This is the kind of feature, like salt-pan deposits on Earth, that's consistent with water flowing in over a long time.

Bright blue marks a deposit of chloride (salt) minerals in the southern highlands of Mars in this false-color image, which highlights mineral composition differences.

Websites:

http://www.sciencedaily.com/releases/2008/03/080320150042.htm

http://www.marsdaily.com/reports/Mars_Salt_Deposits_Point_To_New_Place_In_Hunt_For_Ancient_Traces_Of_Life_999.html



South polar region of Saturn's moon Epimetheus

The Cassini spacecraft's close flyby of Epimetheus (epp-ee-MEE-thee-uss) returned detailed images of the moon's south polar region.

The image shows the southern part of Epimetheus (116 kilometers across) seen previously at much lower resolution. It also shows two terrain types: darker, smoother areas, and brighter, slightly more yellowish, fractured terrain. The images that were used to create this enhanced colour image were taken with the Cassini spacecraft narrow-angle camera on Dec. 3, 2007. They were obtained at a distance of approximately 37,400 kilometers from Epimetheus.

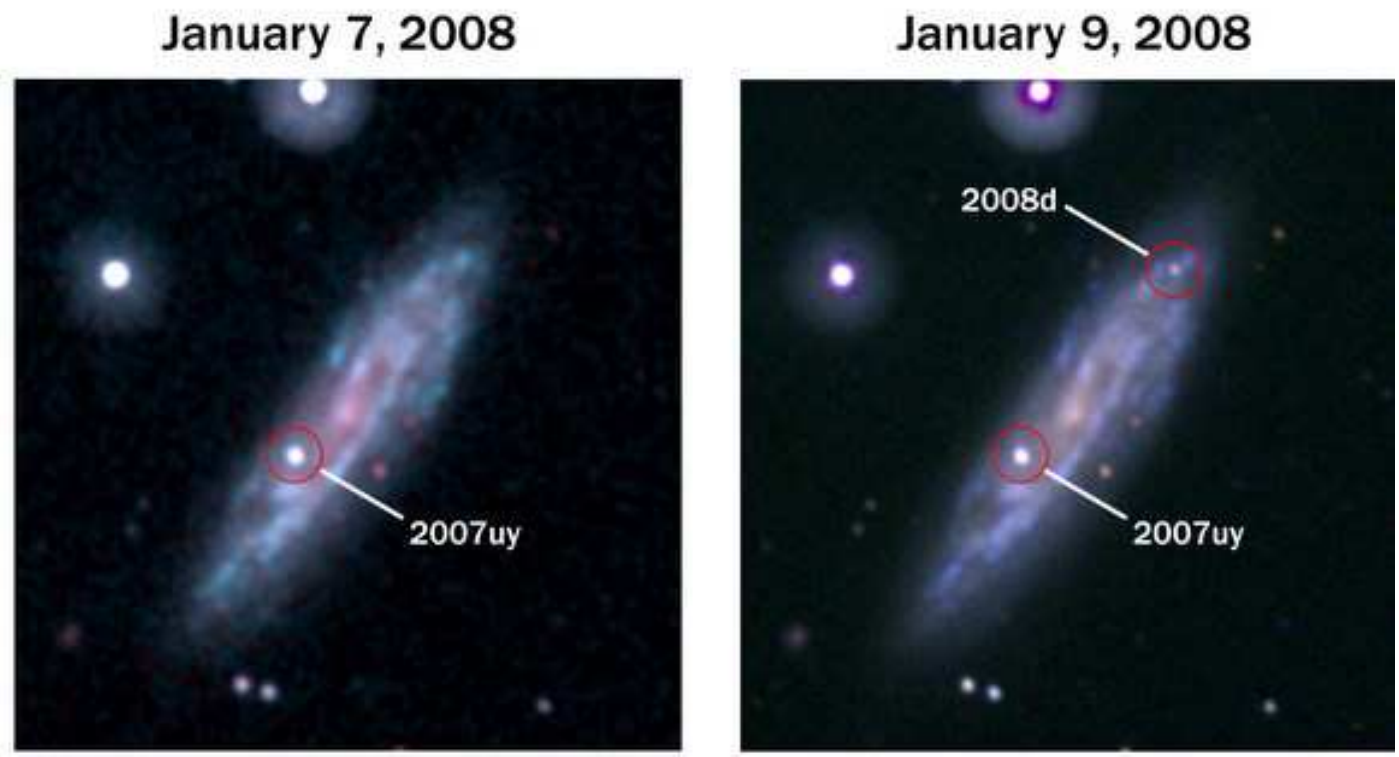
Website: **http://www.solarviews.com/eng/epimetheus.htm**

Supernova ontploffing waargeneem

Weereens was die Swift-satelliet op die regte tyd en plek. Vir die eerste keer kon sterrekundiges 'n ster waarneem wat besig was om as 'n supernova te ontplof. Sulke ontploffings is reeds waargeneem maar dan was die vuurwerkvertoning lank reeds aan die gang. Volgens Alicia Soderberg van Princeton Universiteit gaan hierdie nuut gebore supernova die Rosetta-steen van supernovas wees. Sien die beelde hieronder. Sien webwerf:

http://www.universetoday.com/2008/05/21/caught-in-the-act-astronomers-see-supernova-as-it-explodes/

(Ult: Fokus, nuusbrief van die Orion Observasie Groep, Mei 2008.)



Below: Caricature of our chairman, Michael Poll, doing stargazing

Spectacular poster of colliding galaxies from Hubble

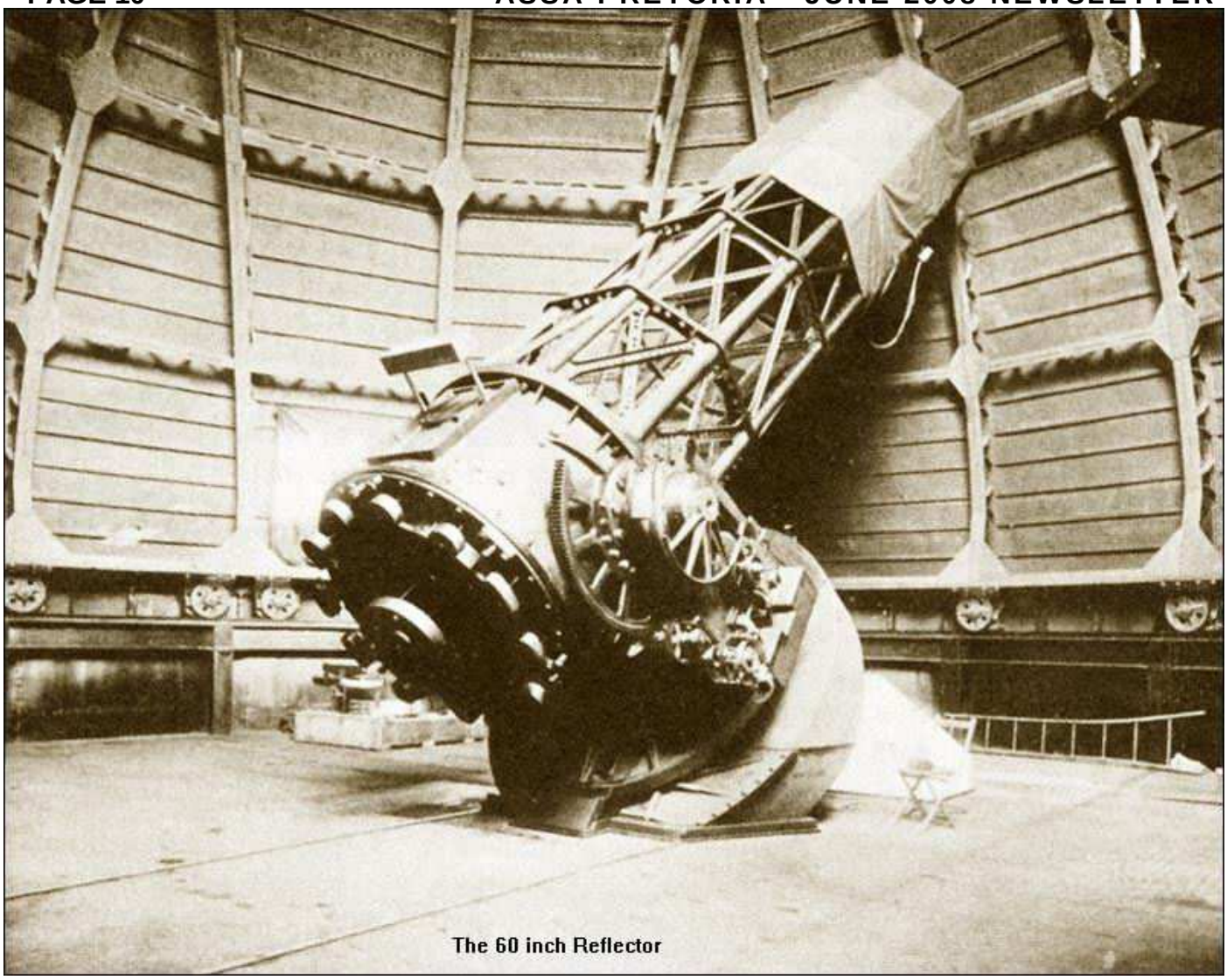
Fifty-nine new images of colliding galaxies make up the largest collection of Hubble images ever released together. As this astonishing Hubble atlas of interacting galaxies illustrates, galaxy collisions produce a remarkable variety of intricate structures.

Interacting galaxies are found throughout the Universe, sometimes as dramatic collisions that trigger bursts of star formation, and on other occasions as stealthy mergers that result in new galaxies.

Website:

http://sci.esa.int/science-e/www/object/index.cfm?fobjectid=42634

(From: SpaceTides E-zine May 2008.)



The 60 inch Reflector

The 60 inch reflector telescope at Mount Wison, California, USA. You can read a full article on it at website address

http://query.nytimes.com/mem/archive-free/pdf?_r=1&res=9B0CE0DA1431E233A25752C2A9639C946096D6CF&oref=slogin

M2 (NGC7089): Globular Cluster in Aquarius
Distance from Earth: 36200 light years at magnitude 6.5v
Imaged with 1 meter Telescope at SAAO Sutherland

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