The PRETORIA CENTRE
of the
Astronomical Society of Southern Africa
www.pretoria-astronomy.co.za

NEWSLETTER OCTOBER 2006

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

Date and time	Wednesday 25 October at 19h15
Chairperson	Michael Poll
Beginner's Corner	"Electromagnetic Spectrum part 2" by Michael Poll
What's Up	Hein Stoltsz

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

MAIN TALK

Turkey total eclipse
by
Dr Barbara Cunow (UNISA)

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

INSIDE THIS NEWSLETTER

Observing Evening Report - September 22nd - by Michael Poll & Johan Smit

We were 20 or more at the observing evening and we were happy to welcome Keith, Barend and Julian who visited us from the Johannesburg Centre. They are all involved in the telescope making class. We look forward more such visits in the future. As well as the people, there were a good number of telescopes. There were no clouds, just haze and city lights.

Jupiter is getting lower in the west in the early evenings now, but it is always an interesting target. Io and Europa were very close to each other, appearing almost as one with low power, but could be seen to draw apart as the evening progressed. Some of the sights of Scorpius were noted, including M6, M7, and the globular cluster NGC 6388 near theta Scorpii.

In the north we looked at Albireo, and in the north east the very pretty globular M15 (NGC 7078) in Pegasus. The cluster lies in an attractive star field, and can be found slightly to the west of epsilon Pegasi, which has the name Enif, meaning “the nose” (of the horse). Uranus was seen, it is now very close to lambda Aquarii. Neptune was not positively identified.

There were some large telescopes, including Dennis’ and Karl's 12 inch Dobsonians. The latter showed us the Ring Nebula when it was only a couple of degrees above the horizon! Not the best opportunity for viewing this object, but later we saw stunning views of the globular cluster 47 Tucanae – a wonderful sight at all magnifications

We looked at some double stars, including alpha Centauri, and also some of the comparison stars for the variable star S Pavonis.

The Centre 12 inch in the dome spent the early part of the evening on the Jewel Box, giving every one a good view of this pretty cluster despite it being quite low in the south west. We will say goodbye to this sight for the next few months, because it will not be visible for the next few practical evenings. After that we studied M6 and M7, and compared the views between the12 inch and two home-made 6 inch telescopes at different magnifications. We also studied these two objects with binoculars, this experiment was done for the benefit of some first time visitors, Hansie, his fiancée and Sonja. We are proud to announce that the performance of these home-made telescopes did impress these unbiased observers compared with the other telescopes despite their being smaller in aperture. After this they were taken on a binocular tour of the Coathanger, Sagitta and Delphinus. Then we had a good look at the “double-double” (epsilon Lyrae). We trust that the first time visitors got value for their effort to visit us and hope to see them again as members.

After everyone left Johan and Julian stayed behind and, at a more sedate pace, just enjoyed going over all the objects that were still visible, and planning our next telescopes. Julian is currently busy with a 10 inch and Johan with a 10 and 14 inch so there is a lot to discuss and plan. The time passed so quickly that we suddenly realised that Orion was up, so we stayed longer and had a good first look at M42, the great nebula in Orion, and also at the Pleiades (M45). By then the sky had cleared so much that we could see some nebulosity around the bright stars in the Pleiades. This all means that summer is nearly here so we said “Hallo” to the summer constellations and “Goodbye” to the winter ones on the same night! We finally closed up just after 02:00.

Telescopes for sale

Telescopes and Eyepieces now in stock at very affordable prices. Excellent 6, 8, and 10 inch Dobsonian telescopes and more. Long Eye-Relief, Zoom eyepieces and Moon filters. Contact Wayne Mitchell, Telescope S.A. at
072 465 7739 or (012) 719 9065 w.

Condolences

It is with sadness that we inform you that Michael Poll's father has passed away. His father was 91 and died in his sleep.

Michael, we wish you strength during this difficult time.

Early success for SuperWasp

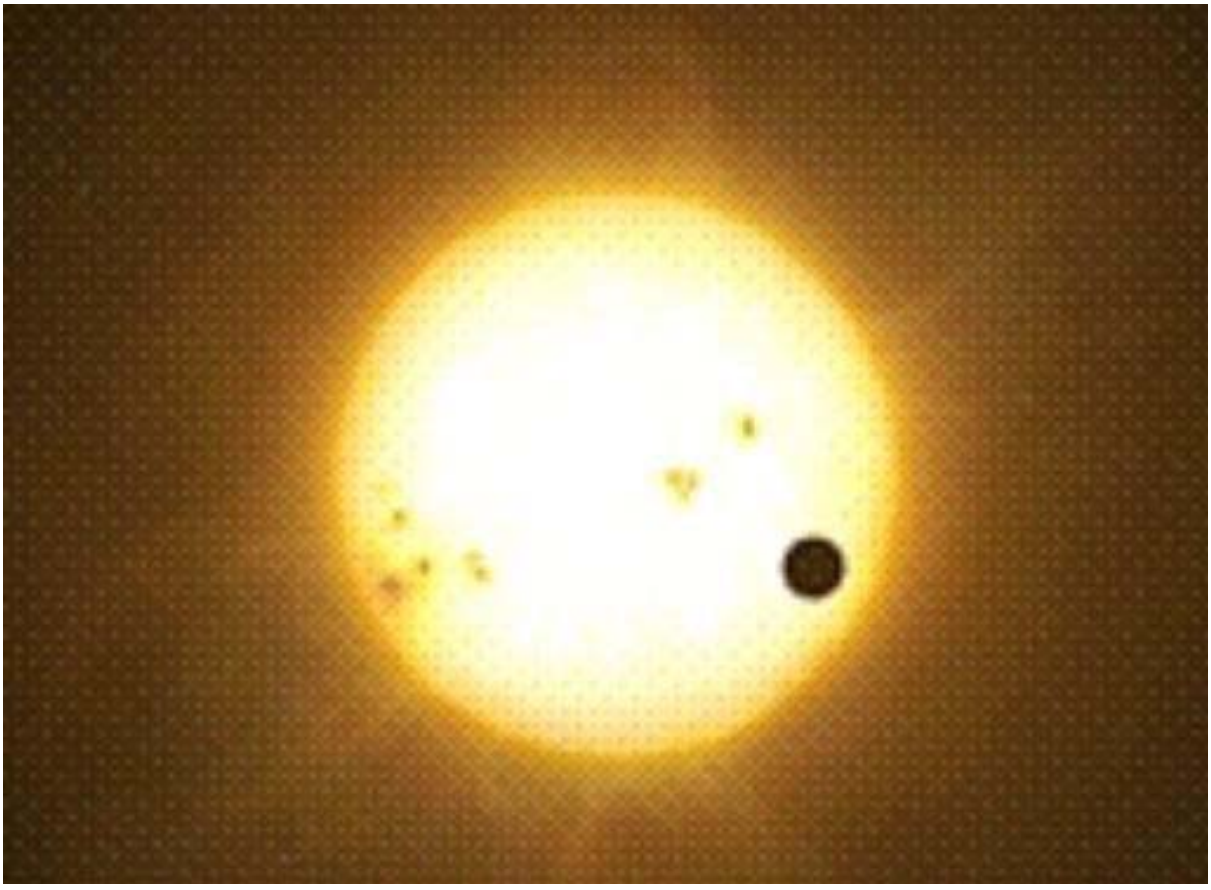
A new wide-field survey of the sky has made its first major discovery - two planets orbiting far-distant stars. The SuperWasp project (noted in the June 2006 newsletter) uses camera lenses and super-sensitive detectors to monitor stars for tiny dips in light that might betray a passing planet.

The UK-led project identified a number of "suspects" and then handed the data to a French observatory for checking. It used an instrument to analyse the light from the stars in detail and confirm the presence of the planets. "To get these two we had to survey about 1.1 million stars and then go though several stages of filtering. It's a bit like panning for gold," Professor Andrew Collier Cameron from the University of St Andrews told BBC News.

The two extrasolar (outside our Solar System) planets, now known as Wasp-1b and Wasp-2b, are in the constellations of Andromeda and Delphinus.

Website for more info about discovery: http://news.bbc.co.uk/2/hi/science/nature/5378562.stm

Superwasp website: http://www.superwasp.org/



An artist's representation of an extra solar planet in transit across the disk of the star it is orbiting.

South African astronomical history

Recently I went to a hiking camp of the MCSA (Mountain Club of South Africa) in the Grootrivierberge, situated east of Willowmore. I got a lift from Johannesburg to there in a Combi. With me in the vehicle were four members of the Johannesburg section of the MCSA. We talked, and I found out that one of them, Peter Finsen, is the son of the late William S. Finsen, who was a South African astronomer.

W S Finsen had done some photography of the planets, particularly Mars. He was a rival of Earl Slipher, another astronomer who had also done photography of the planets. But they did not work together, because they were rivals.

For those of you who are interested in South African astronomical history: There is an article titled “Recollections of William S Finsen, former director of the Republic Observatory.” It was published in MNASSA* vol 64 nos 3 & 4 April 2005 p 45.
Peter also sent me the following email message:

“*I have in my possession a book called "A Photographic Study of the BRIGHTER PLANETS" by Earl C Slipher of Lowell Observatory. It is copy 048 of an individually numbered limited edition, differing from the standard edition in that the photographs are actual photographic prints and not half-tone reproductions.*

It was published jointly by Lowell Observatory, Flagstaff, Arizona and the National Geographic Society, Washington, D.C.

This represents Slipher's life's work, and although modern technology has in some cases now enabled photographs of incredible detail and clarity to be taken by means of orbiters and robotic rovers on the planetary surface itself, this volume has value as an historic documentary record.

If anyone has an interest in acquiring this impressive work, they should please communicate with me by email.”

Peter’s email address is: finsen@iafrica.com

*MNASSA = Monthly Notes of the Astronomical Society of Southern Africa

Editor

New book

I received the following e-mail message:

“You can find my new book, ***Astronomical Observatories and Observers****, on Lulu.com as below and I think this might be of interest to your society / members, perhaps you would be kind enough to mention it at your next meeting or via any newsletter you produce*. **www.lulu.com/content/282390**

Regards

Ian Howard-Duff”

Dries van Zyl se foto's van die maan

Die maan soos gefotografeer vanaf Erasmusrand op 25 Januarie 2005 en 19 Augustus 2005 toe perigeum en apogeum met volmaan saamgeval het. Na aanleiding van Sky &Telescope se Skywatch '05 kalender.

By apogeum bedek die skyf van die maan die son nie ten volle nie. Dit was ook die geval met die vorige sonsverduistering wat gevolglik 'n ringverduistering was.

Atoms and Stuff Part 1 — by Michael Poll

Aristotle proposed that all matter was made of four elements – earth, air, fire and water, and that matter was acted on by two forces, namely gravity, which caused earth and water to sink, and levity, which caused air and fire to rise. Well, we still divide the universe into matter and forces. Matter is divided into baryonic matter (the "stuff" that is familiar to us) and dark matter, and there are four forces in nature – gravity, electro-magnetism, the strong nuclear force and the weak nuclear force. Aristotle also thought that matter could be divided an infinite number of times, but Leucippus and Democritus suggested that everything is composed of minute indestructible particles called atoms – "atom" is a Greek word that means "indivisible".

The problem of what matter was composed of on the smallest scale was not solved until the 19th century. In 1803, John Dalton produced evidence for atomic theory, showing that elements combined in proportional amounts to form molecules. Michael Faraday's experiments with electrolysis in 1834 were the first evidence that atoms were not solid. J J Thompson identified the electron in 1897, thereby showing that the atom could be subdivided.

In 1911 Ernest Rutherford showed that the atom was composed of electrons orbiting around a nucleus, and in 1914 Robert Millikan isolated the electron, and measured its charge.

In 1920 the proton was isolated and named. It was assumed that the nucleus was composed only of protons, but in 1932, James Chadwick discovered the neutron. A neutron can be formed if a proton and electron are squeezed together - think neutron stars!
Neglecting sub-atomic particles, at the atomic level, the nucleus is composed of protons and neutrons, with orbiting electrons. The protons have a positive charge and the neutrons are electrically neutral. The number of protons defines the element. For instance, an atom with 80 protons is an atom of mercury, one with 8 protons is an atom of oxygen. If the number of protons changes, the atom becomes that of another element e.g if mercury lost a proton, to give it 79, it would become gold. Changing the number of protons is the transmutation that the alchemists were searching for, but at that time, they could never have succeeded in doing it, because the force required is too great.
Protons have a like charge (they are all positive) so they would tend to repel one another. The strong nuclear force binds them together, helped by the presence of neutrons. The hydrogen atom (one proton and one electron) has no neutrons, and in a few other elements the number of neutrons is equal the to the number of protons. However, in most elements, the number of neutrons is higher than the number of protons perhaps because the bigger nuclei need more neutron "glue". Neutrons do not affect the chemical properties of the atom (these properties are determined by the orbiting electrons), but they do affect its mass. The ***atomic number*** of an element is the number of protons it has, and the ***atomic mass*** or ***mass number*** of an element is the number of protons plus the number of neutrons.

The number of **electrons** in an element is equal to the number of **protons.** The mass of an electron is 1/1840th of the mass of a proton, so the mass of the electron in the total mass of an atom is negligible. This is similar to the solar system where more than 99% of the mass is concentrated in the sun, but actually in the atom the proportion of mass concentrated in the nucleus is even greater than in the solar system.

If an element has more than its normal number of neutrons (or sometimes it has less), it is it is called an isotope of the element. It is still the same element, because the number of protons has not changed, and the chemical properties are unaffected. Isotopes were discovered because early investigators were puzzled by what appeared to be atomic weights that were fractions, instead of whole numbers. An element is a mixture of atoms of the same substance, but the variation in the number of neutrons gives some of the atoms a different mass number, so the ***mass*** of the nucleus of the element varies.

For example, chlorine normally has 17 protons and 18 neutrons, which is written as ^{35}Cl (35 is the atomic mass and is 17 + 18). Some chlorine atoms have 19 neutrons, making an isotope which is ^{36}Cl.(17 protons plus 19 neutrons). The atomic mass of a sample of chlorine works out at 35,457 which was the puzzle. The atomic mass is not the average of the two, (35.5), because the isotopes are not in equal proportions. Another example, oxygen, normally has 8 protons and 8 neutrons which is ^{16}O. However, 0.04% of oxygen atoms have 9 neutrons, and 0.2% have 10, forming ^{17}O and ^{18}O respectively. Uranium normally has 92 protons and 146 neutrons: ^{238}U, but 0.7% of uranium atoms have 92 protons and 143 neutrons, which is ^{235}U.

Normally hydrogen has no neutrons, but 1 out of 5000 atoms does have one. This is "heavy" hydrogen, and is known as deuterium and it was discovered in 1934. Water that contains a deuterium atom instead of a hydrogen atom is known as "heavy water".

(To be continued.)

Mars Global Surveyor images

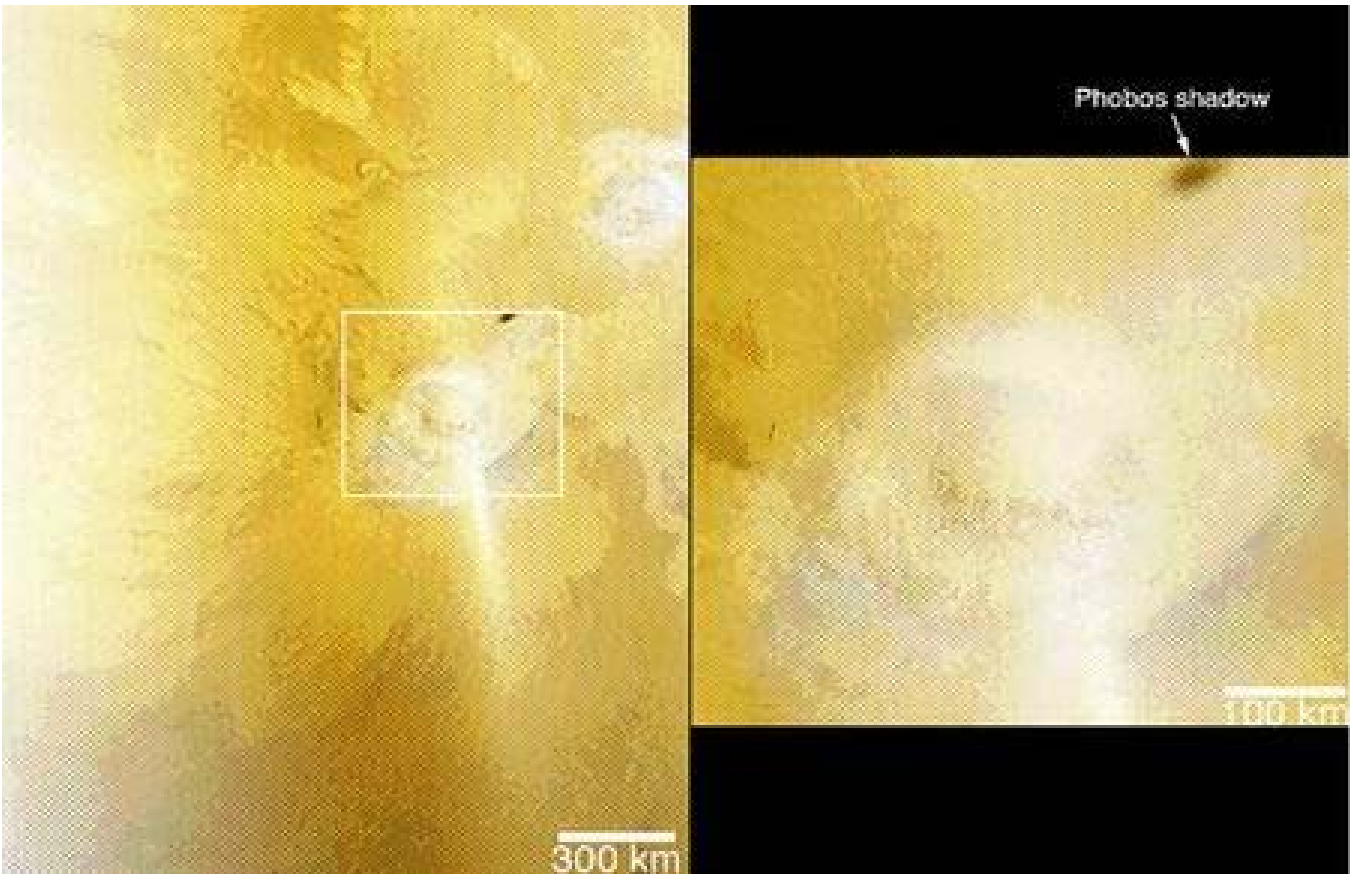
This pair of Mars Global Surveyor (MGS) Mars Orbiter Camera (MOC) colour images shows early autumn clouds over the Arsia Mons volcano, plus the shadow of the innermost of the two Martain moons, Phobos. The picture on the left is taken from the MOC daily global map acquired at 7.5 km per pixel on 28 January 2006, about a week after the start of southern autumn. The picture on the right was taken at the same time, but at a higher resolution of 489 m per pixel.

Both pictures are composites of MOC red and blue wide angle images, and both are oriented such that north is up and east is to the right. Arsia Mons and the other large Tharsis volcanoes commonly develop afternoon orographic (*i.e.,* topographically-controlled) water ice clouds at this time of year. The equatorial Tharsis volcano, Pavonis Mons, is also under a deck of water ice clouds; it is located toward the upper right corner of the left, lower-resolution image.

Sunlight glints off the dusty surface and the clouds and aerosols in the atmosphere, producing the bright diagonal streak located just southeast (lower right) of Arsia Mons. A water ice haze is seen on the left side of the lower-resolution image. The dark oval to the northeast of Arsia Mons, as noted above, is the shadow of Phobos.

See many more photos on website

http://www.msss.com/mars_images/moc/2006/02/06/



Cat's eye nebula

The Cat's Eye Nebula, one of the first planetary nebulae discovered, also has one of the most complex forms known for this kind of nebula. Eleven rings, or shells, of gas make up the Cat's Eye. Image made by the Hubble Space telescope. See website:
http://hubblesite.org/newscenter/newsdesk/archive/releases/2004/27/image/a

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