



The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER SEPTEMBER 2005

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

Date and time Wednesday 28 September at 19h15

Chairperson Lorna Higgs

Beginner's Corner by Jan Plomp

What's Up by Michael Poll

+++++++ **LEG BREAK - Library open** ++++++++
MAIN TALK

The Cosmic Rainbow * **by Pierre Lourens**

* See page 3

The meeting will be followed by tea/coffee and biscuits as usual.

The next social/practical evening will be held on Friday 23 September at the Pretoria Centre Observatory, which is also situated at CBC. Arrive anytime from 18h30 onwards.

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Last month's meeting - by Peet van Der Walt

The August meeting was a well attended meeting like most of the previous meetings. It was the first time for me as chairperson.

I was just to glad to shift the lime light to Wayne Mitchell as he did the talk on "What's Up". He started with a nice talk on a few features on the moon. The Alpine valley and the Acules Fault were two of the areas on the moon he mentioned. A few of the Messier objects also had a turn and he referred to the similarity between M7 and M25. M24 in Sagittarius was identified as an easy object to look for and we received instructions on finding the Ring Nebula (M 57) in Lyra and then how to move on to Albireo, the top star in Cygnus the Swan.

Johan Smit het by Wayne oorgeneem met 'n interessante praatjie oor die "Foucault test". Eers het Johan meer inligting gegee oor Foucault homself. Hy is die persoon wat die spoed van lig bepaal het en hy het die Foucault pendulum gebou, waarmee 'n persoon die breedte graad waar hy hom bevind mee kan bepaal. Foucault was die eerste persoon om suksesvol 'n foto van die son te neem en hy het ook silwer op glas neergelê met 'n chemiese proses.

Die Foucault toets vir teleskoop spieëls word in 'n donker area gedoen met die

hulp van 'n flou ligbron en 'n skerp lem. Daar word ook na die lem verwys as "cornea cutters". Die basiese werking van die toets is om die radius van die spieël op verskeie plekke te meet en dan in verhouding met mekaar te bring. Die resultaat van die toets sal dan bepaal of die vormings werk van die spieël voltooi is en of daar nog aan gewerk moet word.

Ek sien egter uit om my eerste Foucault toets te doen wanneer Johan sy kennis oor spieël slyp met ons begin deel.

The main talk was not a talk as such but a very interesting DVD on the two Rovers - Spirit and Opportunity - that landed on Mars. The aim of the project was to see if any form of life could be found on Mars. It was nice to see some of the preparations done by the team of NASA and then the big moment. Well it turned out to be not so big as there was something wrong with the first rover. The DVD showed how the team on Earth would try and fix the problem-which they did - and how they had to cope with the difference in day length between Earth and Mars. The rovers did a great job up there and helped us to get some more info on the surface of Mars. After looking at all of this one just realises how little we know of the things out there.

Last month's observing evening— by Johan Smit

All I can remember was that we did have a good look at Venus and Jupiter with the 12". Later on we moved it to the jewel box, because there were quite a number of visitors who has not seen the jewel box properly yet. This time they definitely did despite the nearly full moon. Neville and the van der Linde brothers did an intensive computer study of the moons of Jupiter and the Red Spot.

I am also pleased to announce that most of the visitors that were there did join and one of them also joined the telescope making class.

Boyden Observatory:

The proposed University of the Free State-Boyden Science Education Centre "Launching the community into an era of science and technology"



Telescope Making Class - further news

I have obtained verbal approval from the Headmaster of High School Centurion to use the school's premises for our proposed telescope making class. The exact details of the arrangement will be finalised during the next school term.

This means that any-one thinking about building a telescope should start thinking real hard and let us know whether they are really ready for such a commitment. We need to start planning the purchasing of supplies (glass, grit, pitch etc.).

Prospective students can contact me so that I can start estimating the start-up cost.

Vredefort Trip September 24th 2005

The Vredefort Trip is on for Saturday September 24th 2005. 38 members and friends have booked for the trip, and the list is now closed. People are reminded to meet at Bernie's Diner in Parys, at the junction of the main route through Parys (old N1) and the R53 from Potchefstroom, at 8h30 (allow ~90 mins from Jhb). The tour will end by about 15h30.

The cost for the trip is R20 per person. People may pay Michael Poll on the day.

This Month's Main Talk

Aberration of starlight and the Doppler effect are two effects predicted by the restricted theory of relativity. Ordinarily, these are observed when $v/c \ll 1$. However, in an imaginary spaceship with v such that $v/c \rightarrow 1$, these two effects become extreme. The appearance of the stars from such a spaceship will be very different from what you would expect.

The Discovery of Neptune – Part One: Mostly the Standard Version by Michael Poll

William Herschel discovered Uranus in 1781. By the 1830s it was noticed that Uranus was wandering from its predicted place, a deviation that could not be explained by the gravitational influence of the sun or the known planets. In 1834 Thomas J Hussey, an English clergyman and amateur astronomer wrote to George Biddell Airy (then at Cambridge University) suggesting that the erratic movements might be a means of tracking down a hypothetical planet. Airy was not impressed, and replied (November 23rd 1834):

I have often thought of the irregularities of Uranus, and since the receipt of your letter have looked more carefully to it. It is a puzzling subject, but I give it as my opinion without hesitation that theory it is not yet in such a state as to give the smallest hope of making out the nature of any external action on the planet...."

In 1841 John Couch Adams, an undergraduate at Cambridge, independently surmised that a more remote planet could be perturbing Uranus. After he graduated in 1843 Adams started working on the problem. In February 1844, through the Professor of Astronomy at Cambridge, Revd. James Challis, he obtained observational data about Uranus from Airy



John Couch Adams

(who was by now the Astronomer Royal), and had worked out an approximate position in 1845. He sent his calculations to Challis, who passed them to Airy in a letter dated September 22nd 1845, asking if Airy

could spare Adams "a few minutes of his valuable time" and suggesting that Adams himself would deliver the documents. There is a possibility that Adams called on Airy in September 1845, but Airy was away, but on about October 21st 1845, Adams called at Greenwich three times but missed Airy each time. He wrote a letter to his parents (23rd October 1845), saying he had left a note with the Astronomer Royal "containing a short statement of the results at which I had arrived". Airy replied to Adams' note on November 5th, thanking him for "the paper showing the perturbations on the place of Uranus" and asking a question about the error of the radius vector of Uranus, which Adams regarded as trivial, so Adams made no response and nothing was done. Airy did not order a search.

Meanwhile, also in September 1845, in France, Urbain Jean-Joseph Le Verrier had independently started work on the same problem. His first prediction of the position of the possible planet was presented to the Paris Academy on June 1st 1846, and a copy reached Airy on June 23rd. As soon as he read it, Airy realised he had seen a similar result the previous autumn, and, considering the importance of the matter, instructed Challis to do a search, which Challis started on July 29th using an ephemeris provided by Adams. However, Airy did not pass on the information about Le Verrier's work and Challis was by no means energetic. He had no good charts of the relevant area of Capricornus, nor did he go to the predicted position. He made a star by star search over a large area of sky, checking each star as it came into view. Although Adams had predicted the planet would be fainter than magnitude 9 (it was 7.8 at time of discovery) Challis was not so optimistic and checked all stars to magnitude 11! This took a great deal of time, and as Challis wrote to Airy "I go over

the ground very slowly”

Le Verrier had made a further refined prediction by August 31st, and sent it to the Paris Observatory, but they were also lethargic, and Le Verrier could not get a search organised. Le Verrier was not a patient man so he sent his calculations to Johann Galle at the Berlin Observatory, who was known to him. Galle went



straight to the observatory director Johann Encke to ask for permission to use the 23 cm Fraunhofer refractor. Encke agreed: “Let us oblige the gentleman from Paris”. Heinrich d’Arrest begged to join in and they

started immediately. Galle was no Challis. On Sept 23 1846 he turned the telescope to the position given by Le Verrier. He called out the positions of the stars that came into view so that d’Arrest could check them on the observatory’s new chart of the relevant section of the sky. Within minutes Galle called out a star at RA 22h 53m 25s and d’Arrest exclaimed “That star is not on the map!” Encke wrote to Le Verrier: “The planet whose position you have pointed out actually exists. Allow me sir to congratulate you most sincerely on the brilliant discovery with which you have enriched astronomy”.

Challis learned of the discovery a few days later. Upon checking, he found that he had observed the planet twice during the first week of his six-week search, but had not compared his observations, and so Neptune was missed. Airy himself was bitterly criticised for his inertia.

On October 3rd 1846, 10 days after the discovery, Sir John Herschel made the

first public announcement about Adams’ work, and, in a letter to the “Illustrated London News”, published on October 10th, James Glaisher a senior worker at Greenwich, stated that “about four months ago” both Adams and Le Verrier had: “concluded, independently, from theoretical calculations” the position of a perturbing planet, and implied that both the results agreed to within one degree. Glaisher’s words were almost identical to a report sent by Challis to the Cambridge Chronicle, published on October 1st.

On November 13th 1846, Airy presented a document before the RAS, stating that it was the note that Adams had left for him in October 1845. It was the first indication of any sort that he had such a document, but there were no enquiries to why he had it for 13 months and not published it. Standard versions of the story state that Airy had “placed the papers in a drawer” and only discovered (“remembered”) them after the planet had been found.

The French were furious at the suggestion that Adams deserved to share in the discovery, and of Airy’s attempt to get belated recognition for Adams. The whole controversy became very heated, nevertheless, in the standard version, history has given Adams and Le Verrier equal credit.

However, the traditional tale has depended too much on British interpretations that were given only *after* Neptune’s discovery. It is necessary to disentangle these post-discovery reconstructions from historical events. Central to the history of the debate is the “Neptune File” of the Greenwich Observatory which was recovered in 1999 (in Chile!) after being missing since the 1950s. The Adams archives at St John’s College, Cambridge, also became accessible in the same year.

To be continued. References to follow.

Aurora australis from SAAO

Photo taken by Stephen Potter, SAAO, on April 7, 2000. Photo copied from their website at www.saa.ac.za. Note: The Sun reached the maximum of its 11-year cycle of activity around 2000.



SKY AND TELESCOPE

Sky and Telescope magazine, published monthly, is available to members through a subscription service. Members of our Centre are eligible for a discount if they make their subscription through us.

Anyone who wants to subscribe to this magazine, may contact Mike Haslam; email : mbh@connectit.co.za for more details.

Tenth planet has a moon

Newly disclosed observations of the tenth planet discovered in the outer solar system show that it has a moon. See website

<http://www.newscientistspace.com/article.ns?id=dn7758>

NASA Telescope Reveals Nearby Galaxy's Invisible Arms

A new image from NASA's GALEX (**Galaxy Evolution Explorer**) shows that a galaxy once thought to be rather plain and old is actually endowed with a gorgeous set of young spiral arms. The unusual galaxy, called NGC 4625, is a remarkable find because it is relatively nearby. See website

<http://www.sciencedaily.com/releases/2005/07/050728061016.htm>

For more about GALEX, see website <http://www.galex.caltech.edu/>

Invitation to members

Members are invited to send short articles, to be considered for placement in the newsletter, to me by e-mail. This is the way you can share your astronomical knowledge with other members of the club.

Astronomical website addresses, information about astronomical computer packages, relevant news, views, experiences, book reviews, references to interesting articles, notices of astronomy lectures, details about astronomy courses, etc., etc., which are sent to me, will also be considered.

Just check your contribution for accuracy before e-mailing it. It must reach me by the second Wednesday of a month to be considered for that month's newsletter. We would like to have as much local content as possible in the newsletter, because "local is lekker" — Leon Schuster.

Editor

Astronomical website addresses

Spend some educational (and entertaining) evenings browsing on these websites – it's far better than watching TV!

Images & computer-generated movies of galactic collisions:

http://hubblesite.org/discoveries/cosmic_collision/encounters-more.php

Images of interacting galaxy pairs: <http://crux.astr.ua.edu/pairs2.html>

Collection of Galaxy Pair/Interacting Galaxies Images:

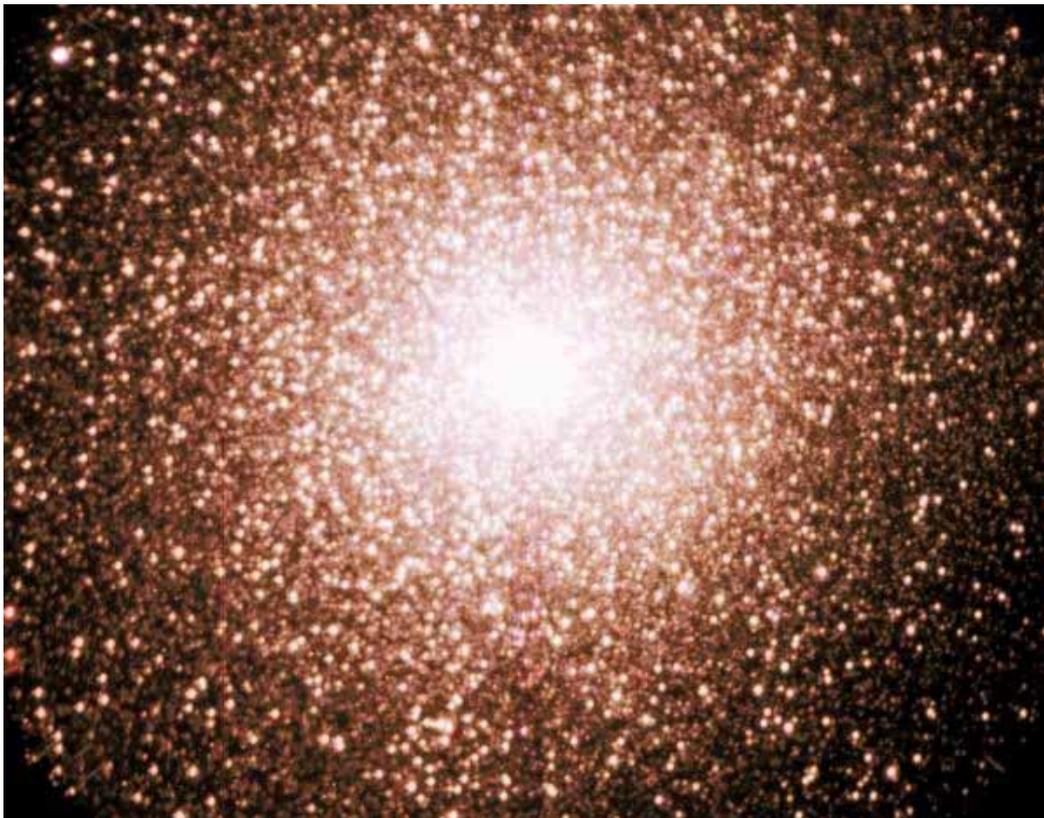
<http://crux.astr.ua.edu/pairstext.html>

A review article for non-specialists on galaxy collisions:

<http://arxiv.org/html/astro-ph/9908269/homepage.html>

First light from South Africa's giant eye

One of the first-light images from SALT is this one of 47 Tucanae. It is an ancient cluster of several million stars (as many as in some very small galaxies), about 15,000 light years from Earth, and 120 light years across. The stars in 47 Tuc are about 10-12 billion years old, making them among the oldest stars in the galaxy (more than twice the age of our own sun). Near the centre of 47 Tuc, stars are so densely packed that solar systems like ours might well be disrupted by passing stars, and night skies might never be fully dark. Such clusters, with huge numbers of stars about the same age, are living laboratories for studies of the life, birth, and death of stars. Image & caption from their website at: www.salt.ac.za



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