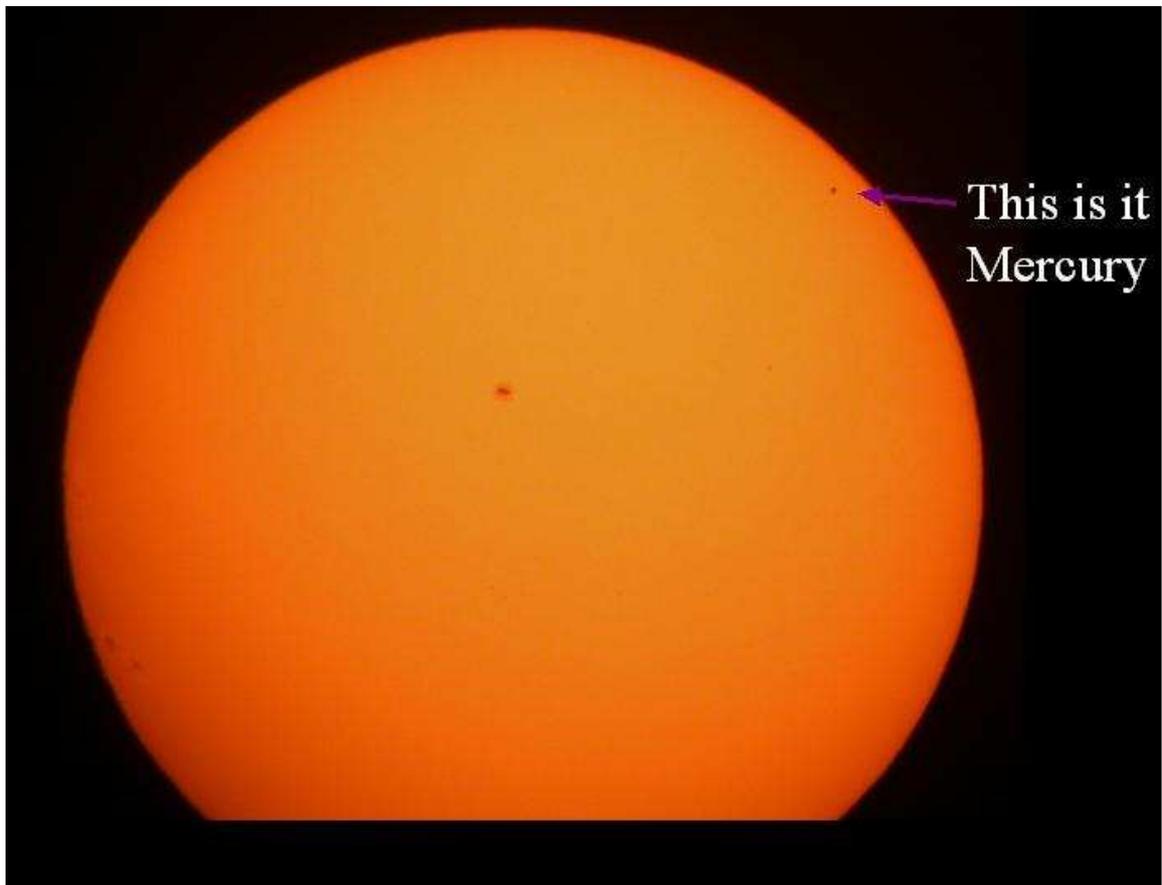


CANOPUS

The Astronomical Society of Southern Africa

Johannesburg Centre

Monthly Newsletter for June 2003



**The Sir Herbert Baker Library, 18a Gill Street, Observatory, Johannesburg
P.O.Box 93145, Yeoville, 2143**

Contents:

Editorial

Notice of Meeting

Welcome to new and rejoining Members	The Committee
Beginner's Classes	Dave Gordon
Calendar of Events.....	The Committee
Astronaut Marsha Ivins.....	Dave Gordon
Variable Stars III	Eben van Zyl
ScopeX 2003.....	Brian Fraser
ScopeX 2003 compilation.....	Chris Stewart
A Perspective by Chris Stewart	
Telescope Making Competition.....	
A Perspective by Chris Penberthy	
The ATM demonstrations, by Vincent Nettmann.....	
The Auditorium Presentations, by Dave Gordon.....	
A visit to a private observatory in the Little Karoo.....	The Tremeers
Spotlight - an Exploration Extravaganza	JPL News
Snippets from the European Space Agency.....	ESA News
Chairman's Chat	Dave Gordon
Making sure they're as clean as possible	NASA News
Pictures from the last monthly meeting	Dave Gordon
ScopeX 2003 <i>An open letter to all who participated</i>	Chris Stewart
In The Sky This Month.....	Brian Fraser

Cover photograph "Transit of Mercury" courtesy of **Tony Halliday**

Editorial

Was it fun or what? ScopeX 2003 was a visual feast of things Astronomical. The interesting display of telescopes both commercial and home-made was a sight for sore eyes and many comments were made in regard to some of those 'scopes into which a lot of love and care had been taken. Some of the home-made Dobs on display were real works of art, and some of the commercial 'scopes looked like they had been removed from a professional observatory. As this is going to be largely a Scope-X 2003 feedback issue, I think I'd best stop my ruminations at this point and leave it in the capable hands of our reporters. *Many great photos are available which we cannot fit into this issue but will available for viewing on our website.*

Chris Stewart has submitted a compilation of several reports pertinent to ScopeX 2003 as well as an open letter to all who were associated with this successful venture, and **Graham** and **Margaret Tremeer** recall a recent enjoyable visit to a private Observatory in Prince Albert in the Little Karoo. **Dave Gordon's** beginner's classes continue running from 19:00 to 19:45 on the evenings of our monthly meetings, and this month he has also submitted an article on the breakfast presentation by **Marsha Ivins**, as well as what hopefully will become a regular "Chairman's Chat".

Trevor Gould passes on an invitation from Mensa to visit the n'Kwe Observatory with them, and **Eben van Zyl** continues with the next in his Variable Stars articles - this one on Eclipsing Binaries. **Brian Fraser** submits his impressions of ScopeX 2003 as well as the heavenly happenings for June and July. We have also include some snippets from the Space Agencies.

Members, please remember that the 2003 Annual General Meeting is just around the corner. This is the opportunity for you to elect your choice of committee for the Year to come. In fact, this could be just the time for YOU to volunteer for a stint on the committee where some of your ideas may come to fruition.

The Editor chris@penberthy.co.za

Notice of Monthly Meeting

The Monthly Meeting of the Johannesburg Centre of the Astronomical Society will be held at the Johannesburg Planetarium, Wits University (entrance in Yale road - under the M2 motorway), on Wednesday, 11th of June, 2003 at 20:00.

"You, Me and the Universe"

By: **Tom Budge**

Telescope Making Classes

Would you like to make your own telescope?...or finish off a partially completed one? Well your opportunity has arrived (once again). Join the Telescope Making Class being held under the guidance of Brian, Evan and Chris. Contact Chris on 763-3301 or email cstewart@alcatel.altech.co.za if you are interested.

ASSA Lists

(Subscribe by sending email to "To Subscribe" address with "SUBSCRIBE" in the body of the message).

	To Subscribe	To send messages
ASSA Jo'burg Centre:-	assa_announce-request@list.to	assa_announce@list.to
ASSA Telescope making:-	assa_telescopemaking-request@list.to	assa_telescopemaking@list.to

Public Viewing (*weather permitting*)

Public viewing nights are held *subject to suitable weather conditions* on the Friday nearest First Quarter, and are held at the Old Republic Observatory, 18a Gill Street, Observatory, Johannesburg. Starting time around 19:30. See the ASSA event calendar for the proposed viewing dates. *Please check with Constant on 972-6038 or email- tabbie@icon.co.za to ensure that viewing IS taking place on the specified evening.*

Welcome to new Members

We would like to welcome the following new Members to the Johannesburg Centre who have joined our society during the last month.

George Le Roux	Viv Crone	Ywain and Lynda Penberthy
Craig and Dawn Spence		Julian and Mandi Kraft
R.W. Curtis	Richard Lai	

...and we would like to welcome back the following old Members who have recently rejoined our society.

Johan Viljoen	Alaric Pagel	Emmanuel Petrokakis
---------------	--------------	---------------------

We wish you clear skies and many happy years of observing

Beginner's Classes 7pm - 7.45pm

Wed 11 June	The Celestial Sphere (<i>meeting at the planetarium</i>)
Wed 09 July	The Magnitude System of measuring stellar brightness
Wed 13 Aug	Essential Observing Techniques
Wed 10 Sept	Position and Time

ASSA Jo'burg Centre - Calendar of Events

Month	Day/ Date	Event	Details
Jun	Fri 6	<i>Public viewing</i>	
	Mon 9	Committee meeting	
	Wed 11	Monthly Meeting	Planetarium Meeting "You, Me and the Universe" Tom Budge
	Sat 21	Grand Solstice Cleanup	At the Observatory
	Thu 26 to Sun 29	* STAR PARTY * - Dark Sky near Lady Grey in the Eastern Cape	<i>Event Moderator:</i> Tony Halliday Cell: 083-276-2975
Jul	Mon 7	Committee meeting	
	Wed 9	Annual General Meeting	Section Reports and elections for the Committee.
	Fri 11	<i>Public viewing</i>	
Aug	Mon 11	Committee meeting	
	Wed 13	Monthly Meeting	Double Stars Chris Middleton
	Fri 29	<i>Public viewing</i>	
Sep	Mon 8	Committee meeting	
	Wed 10	Monthly Meeting	Gravity and Time-Space Karin Cyrus
	Wed 24 to Sun 28	* STAR PARTY * - Extreme Dark Sky excursion to Richtersveld	<i>Event Moderator:</i> Chris Middleton - Cell: 082-920-3107
	Fri 26	<i>Public viewing</i>	
Oct	Mon 6	Committee meeting	
	Wed 8	Monthly Meeting	Practical Astrophotography Tony Halliday
	Fri 24	<i>Public viewing</i>	
Nov	Mon 10	Committee meeting	
	Wed 12	Monthly Meeting	Astronomical MASERS Derck Smits
	Fri 28	<i>Public viewing</i>	

Reminders

2003	Centenary of Flight August 27th : Mars opposition
2004	Centenary: Sir Herbert Baker Library Building <i>Johannesburg Centre to host 2004 ASSA Symposium</i> June 8: Venus Transit
2006	March 29: Total Solar Eclipse

Astronaut Marsha Ivins



Marsha Ivins is an inspiration. She has shattered our macho preconceptions of what an astronaut looks like. Slightly built with shoulder-length hair, Marsha packs a mighty punch. The moment she started speaking, she commanded an awesome respect from her audience.

Those who were expecting a scientific low down on each of her 5 shuttle missions would have been disappointed. She immediately endeared herself to the audience by striking at the human angle of space flight. A barrage of entwined images of her fellow crew members in often hilarious positions of weightlessness, together with her wry and sly sense of humour, saw her audience regularly dissolve into fits of laughter.

As she easily glided from one gorgeous earth-picture to another, there was no pretentious sermon on the destruction of earth by man, just one light-hearted quip after the other. Referring to a recently flooded river delta shot from space: "if you are a smoker, this is what your lungs look like".

Marsha took great delight in captivating her audience with the hilarious detail of how to go

about effectively performing one's ablutions aboard the space shuttle. Other gems included eating dinner previously attached with velcro to the inner walls, exercising in a weightless environment, showering with globules of water, and the connection between brushing teeth and spitting in space.

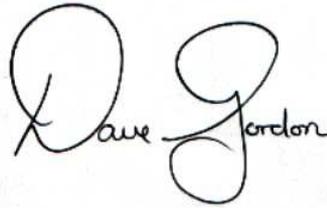
Marsha underplays her achievements and one can almost be forgiven for not quite fully grasping the sheer enormity of responsibility that was placed on her shoulders to ensure that a \$1.3⁺ billion module was attached securely and properly to the International Space Station.

This was one presentation where 45 minutes felt like 5 and I had definitely not yet had sufficient. Marsha handled audience questions thoroughly and compassionately. What a pleasant surprise; when it was time to be critical of NASA (her current employer!) she was. Marsha openly criticised NASA's low productivity and delivery, to the point where she admits "something needs to be done because the space programme has gone almost nowhere since the Moon missions". Her response to an audience member's

suggestion of a future human mission to Mars was a loud "Amen to that!"

At the conclusion, Marsha presented the society with a mounted A3 collage of mission photos, beautifully presented with an STS 98 mission badge, a small South African flag that flew with her on that mission, and a personally autographed presentation plaque to our society! Precious cargo indeed. We will be making A3 laminated copies of this and anybody who attended the Marsha Ivins talk is welcome to order a copy for themselves.

Marsha wanted to be an astronaut from age 6. But only engineers and scientists got to fly into space. So she became an engineer and scientist. She flew 5 times into space. Now, go and realise YOUR dreams!



VARIABLE STARS III

ECLIPSING BINARIES. Stars that revolve around their mutual centre of gravity, their baricentre, will eclipse each other if the plane of their orbits lies in, or nearly in, the line of sight from the Earth. During their revolutions around each other they will eclipse and transit each other. This causes their total brightness to vary and thus they are classed among variable stars although the stars may not undergo any intrinsic variations. When these stars are to the left and right of each other, they are at their brightest and when they are in line with the line of sight from the Earth, they are at their dimmest.

The first star of this sort to be discovered, was ALGOL (Ra's al Ghoel) or Beta Persei. Its variability was known in the days of the Babylonians and because it was the only star known to vary in brightness, having a period of $2\frac{7}{8}$ days (2,86731 days) it was called the Demon star. Its brightness varies from magnitude 2,12 down to magnitude 3,40. The eclipse of the brighter star by the dimmer star lasts about 10 hours. This is the lapse of time for star B to move from B_1 to B_3 on the Graph of variability. The deaf and dumb John Goodricke who lived to the ripe old age of 22 years, was the first to explain the variability (in 1782) to be due to the two stars of a double star, revolving around each other. When the dimmer star comes to the point B_1 it just begins to eclipse the brighter star A. The fact that the light curve is curved downwards at point B_1 is due to limb-darkening (just like the Sun). As the star B moves past in front of star A it cuts off more and more of the light from A and there is a steady decrease in brightness, the magnitude of the pair dimming from 2,12 down to 3,40 when the B-star is at point B_2 , its primary minimum. At B_2 the brightness suddenly

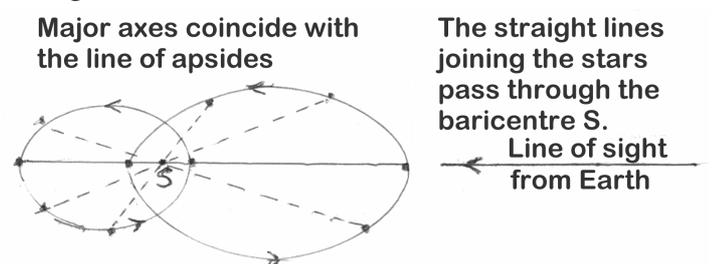
increases. This sudden increase in brightness shows that the eclipse is only partial or if it is total the two stars must be equal in size so that there is only one moment of minimum brightness. In the case of a total eclipse a measurable time will elapse while the dimmer star is transiting the brighter so that there will be a flattening in the graph.

At B_3 when the dim star just stops eclipsing the bright star there is a curve in the light curve due to limb darkening.

As star B moves away from the primary star a slight increase in brightness takes place because of light from the primary being reflected from the surface of the dimmer star. Then a dimming of the total light takes place when star B moves in behind the brighter star A. The fact that there is now a flattening of the curve shows that the dimmer star is larger than the brighter because a measurable time elapses while the area of the light of B is cut off by A at B_5 .

Then limb darkening has its effect again before a slight dimming takes place as star B moves away from star A. The whole process then begins again from point B_7 onwards.

If the secondary minimum is exactly half-way between the two primary minima, it shows that the orbits of the stars are circles or the line of apsides, in which the major axes lie, is in the line of sight from the Earth.



If the secondary minimum is not exactly in the middle between the two primary minima, it shows that the orbits are ellipses. The greater the removal of the secondary minimum from the middle the greater the eccentricity of the ellipses. So the eccentricity of the orbits can be calculated from the position of the secondary minimum. In the case of Algol the eccentricity of the two orbits works out at 0,033 (nearer to circles than the orbits of six of the Sun's planets).

What else can one glean from the orbits of eclipsing binaries?

1. If the minima are rounded off, it shows that the atmospheres of the two stars are in contact with each other, such as in the case of Beta Lyrae.
2. By measuring the period of variability, the period of revolution of the two stars is obtained. By applying Kepler's Third Law: $T_1^2 \div T_2^2 = R_2^3 \div R_1^3$, the masses of the two

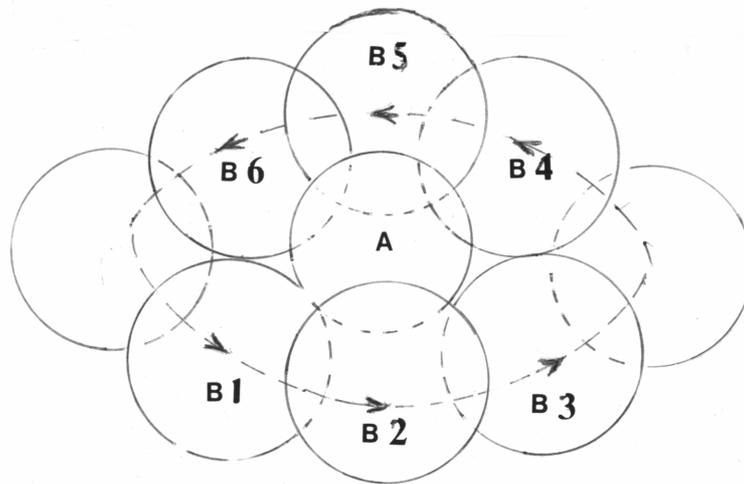
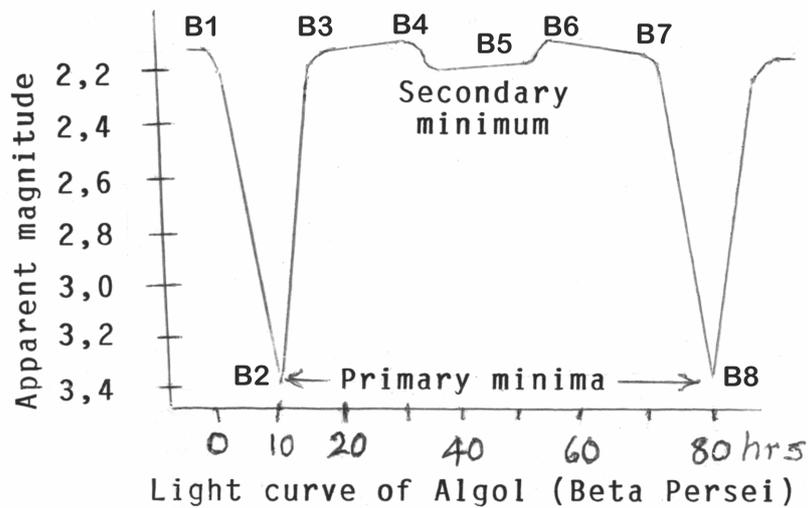
stars and their separations from the baricentre can be calculated.

In the case of Algol the average distance of the bright star from the baricentre is 2,57 million km and that of the dimmer secondary 9 million km. Their masses : are therefore in the proportion of 9 to 2,57 or 3,5 to 1 solar masses.

3. If both the primary and secondary minima are flattened, such as in U Sagittae, the diameters of the stars can be calculated by monitoring the moments of 1st, 2nd, 3rd and 4th contact. Then the absolute magnitudes and the separate magnitudes can also be calculated
4. The line of apsides which is the major axis of the two ellipses rotates in a period of 32 years. This is due to the gravitational perturbation of a third star in the system. The mass of the third body can also be calculated. It works out to 1,3 solar mass and it has an absolute magnitude of 3,2.

ALGOL	Star A	Star B	Star C
Mass (x Sun)	3,5	1,0	1,3
Diameter (x Sun)	3,0	3,4	1,5
Absolute Magnitude	-0,2	3,4	3,2
Luminosity (x Sun)	100	3,6	4,4
Spectral Type	B8 V	K0 IV	F2 V

Star Algol Type	R.A	Dec.	Magnitude		Period days	Spectral type
			Max	Min		
Beta Per	03 07,0	+40 56	2,12	3,40	2,86731	B8V; K0 IV; A
Delta Ori	05 32,0	-00 18	1,94	2,63	5,7324	B0 III; O 9V *
V Pup	07 58,0	-49 14	4,7	5,2	1,454	B IVp; B3 IV
CV Vel	09 00,5	-51 32	6,5	7,3	6,889	B0 V; B2 V
V 505 Sgr	19 52,9	-51 32	6,48	7,50	1,182	A0 V; F8 IV
Beta Lyrae Type						
Beta Lyr	18 49,9	+33 32	3,34	4,30	12,935	B7 Ve; A8p
Mu ¹ Sco	16 51,9	-38 03	2,8	3,08	1,44027	B1,5 V; B6,5V
U Her	17 17,2	+33 06	4,6	5,3	2,157	B1,5 Vp; B5 III
UW Cma	07 18,2	-24 34	4,84	5,83	4,39341	O7 Ia; O
GG Lup	15 18,9	-40 47	5,4	6,0	2,164175	B5; A6
W Ursae Majoris Type						
S Ant	09 52,3	-28 38	6,4	6,92	0,648345	A9 Vn
YY Eri	04 12,2	-10 28	8,8	9,5	0,321495	G5; G5
V502 Oph	16 41,4	+00 30	8,34	8,84	0,453393	G2 V; F9 V



Eclipsing binary star Algol. The dim secondary star revolves around the bright primary star A.

Jan Eben van Zyl

Scopex 2003

Astronomers gathered in Johannesburg on May 10th 2003 from as far afield as Durban and Dundee, in KZN, to attend the annual Scopex telescope and Astronomy day, organised again by the Johannesburg center of ASSA at the Military History Museum, next to the zoo. Coincidentally this day had been selected as the international Astronomy Day. Various branches of ASSA elected to hold functions open to the public on this day.

Bigger and better than last year, it was a huge success and thoroughly enlightened and educated all who attended. Around 1000 visitors enjoyed seeing some 40 (mainly) home-made telescopes with a vast display of commercial binoculars and telescopes of all designs, makes and sizes. Some excellent talks were presented in the auditorium, but more of this elsewhere.

Members of the Pretoria center once again joined in and had a very active section that attracted a

lot of interest. With various superb telescopes, a webcam, a CCD camera, and other gadgets, they certainly earned the interest of young and old.

This year prizes were awarded to some of the telescope makers who had produced something excellent, novel or noteworthy. However the judges had a difficult time choosing between the exhibits and agreed that many of the telescopes that did not win an award, were also very good. Two telescopes showing outstanding workmanship were those belonging to Jan Schut and Peter Baxter, the one a mechanical masterpiece and the other a beautiful wooden piece of art.

There was also lots of fun to be had for kids of all ages with all sorts of scientific toys being demonstrated by Experilab, including a number of rocket launches during the day. While none were seen to actually go into orbit, the heights reached by these little rockets were very impressive.

Exclusive books once again provided a book store, with double the amount of books that they had last year and enjoyed a brisk trade. The Johannesburg planetarium also ran a table with lots of the interesting goodies that they stock, always of interest to the amateur astronomers.

The Alberton radio hams set up a station and demonstrated the tricks involved in making contact with like-minded fanatics all over the world. Alongside their stand, a couple of the telescope-making enthusiasts set up a mirror grinding demonstration that seems to have attracted some 15 new members to the society's telescope making classes.

In the evening, thanks to wonderful clear skies organised by the weather man, it was possible to turn the telescopes to the heavens and show the visitors some of the interesting objects around. Saturn was a wow! , the moons of Jupiter were interesting to watch, and the usual beautiful splendours of the southern skies had numerous people captivated. Tim Cooper's 16-inch dob had an enormous queue all night long, but then so too did some of the other telescopes.

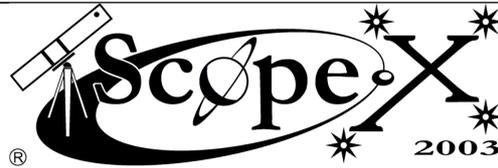
Lerika Cross, secretary at the Jhb center, did most of the organizing and deserves a gold medal for arranging such a successful day, enjoyed by so many. Other members with their families and friends assisted in running the show, including Gill Stewart and Dave Gordon.

Brian Fraser

Committee of the Johannesburg Centre of the ASSA for 2002/3

Chairman	Dave Gordon	702-1219 - dave@turboread.com
Vice Chairman	Chris Stewart	763-3301 - cstewart@alcatel.altech.co.za
Secretary	Lerika Cross	082 650 8002 - lerika@icon.co.za
Treasurer	Dave Gordon	702-1219 - dave@turboread.com
Librarian	Evan Dembskey	710-1535 - evand@nedcor.com
Curators of Instruments	Frans van Nieuwkerk	609-8158 - machteld@iafrica.com
	Peter van Laun	680-7000 - psvanlaun@mweb.co.za
Council Rep.	Dave Gordon	702-1219 - dave@turboread.com
P.R. and Media Liaison	Sharon Tait	447-7512- labelconnection@mweb.co.za
Viewing Officer.	Constant Volschenk	972-6038 - tabbie@icon.co.za
Assistant Viewing Officer	Bruce Dickson	312-1887 - bdickson@mweb.co.za
Membership Secretary	Chris Penberthy	793-7480 - chris@penberthy.co.za
Members	Mary McKinnon	793-1937 - mackinnon@telkomsa.net
	Melvyn Hannibal	435-6007 - melvynhannibal@metroweb.co.za
Editor of CANOPUS	Chris Penberthy	793-7480 - chris@penberthy.co.za

Our Web Address is www.assajhb.co.za
Send e-mail to webmaster@assajhb.co.za
and fax us at (011) 339-2926



Saturday 10 May 2003

A perspective by Chris Stewart

The second annual ScopeX telescope and astronomy exposition has now come and gone and begs the question, "What can one say about the day?" Well, there was a whole programme of lectures, as well as multitudinous telescope to inspect (these being of both home-made and commercial origins), friends to talk to, rocket launches, ATM demonstrations, never-ending questions to field from the public, etc. It was so full, that one person could not possibly hope to cover it all. Many of the participants found themselves so busy that they wished there had been time to catch a lecture, or even just walk about. Therefore, comment from other participants was solicited and follows my own. Hopefully it will give a flavour of the day, and encourage you to join in next year. But first,

Q: What were the main objectives of ScopeX?

A: To have a special day devoted to our hobby, in which we could...

- Promote astronomy in general and telescope making in particular to the public;
- Meet people who share our passion for these pursuits and promote friendship within this select community;
- Show off our handiwork and exchange ideas, knowledge and experience;
- Recruit new ASSA members.

In terms of these objectives, the first ScopeX succeeded to such an extent that we were encouraged to pursue our vision of an annual event. On balance, this year's event was similarly successful. While nothing can recapture the "vibe" that the first example of any event engenders, lessons learned last year stood us in good stead. Of course, we are still "experimenting" and - although we did learn even more this time round - we would certainly

welcome feedback from participants and visitors alike, in order to ensure the continuation, growth and success of ScopeX.

How do we know it was successful? Apart from the many favourable comments at the time, and the generally mellow atmosphere on the day, the Johannesburg Centre had a sizeable influx of new visitors to the following monthly meeting. Similarly, the Telescope Making Class was literally inundated with new arrivals the following week. If the level of enthusiasm of the newcomers to the class can be sustained, we can expect many new instruments to be on display next year.

So what was different this time? Some of the more readily identifiable things would be...

- The number of amateur telescope exhibitors grew from 27 to 43, which was excellent. Several of the exhibitors presented more than one item, and most brought friends and family too.
- On the other hand, at 900+ we had slightly fewer public visitors, this being largely attributable to clashes with other events.
- Participation from people outside the Johannesburg Centre increased notably. We were very pleased to have a greater presence from ASSA Pretoria. That exhibitors arrived from as far afield as Dundee and Durban, bodes very well for next year.
- A reward system for the exhibitors was introduced (more on this below).
- There were again 10 lectures, but with six professionals presenting talks compared to three last year. Feedback from attendees was very positive. However, we are still trying to work out a way for exhibitors to be in two places at the same time so that they too can attend all the lectures! It was a gruelling

schedule for Dave Gordon, who did an excellent job as Master of Ceremonies.

- The Telescope Making Demonstration was a vast improvement on last year and Vince Nettmann did brilliantly: he had a nice display and managed his team of helpers very well. It was clearly popular with the public, who kept the team on their toes with endless streams of questions, many of which were answered by way of practical demonstrations.
- Commercial telescope exhibitors increased from one to four this year and a popular science commercial component was introduced; this gave a total of seven commercial exhibitors. The point is not to become a heavily commercialised venture, but rather to provide the public with a balanced mix of commercial and amateur-built astronomical equipment, as well as books and the like. This way, people can make comparisons, understand what is available or achievable and make informed decisions. Some commercial sponsorship is certainly necessary to make the venture economically possible.
- The Information Desk had more staff this year and thus coped better.
- Public viewing was encouraged, with a much larger presence later into the evening despite the colder temperatures that arrived as soon as the Sun approached the horizon.
- Many more telescope sported Solar filters, these no doubt being largely due to the December 2002 eclipse but perhaps also the Mercury transit earlier that week. A number of sunspot groups, including one rather large one, were visible. Hopefully this will lead to an increase in Solar viewing.
- More people appear to be involved in electronic imaging, be it with dedicated CCD cameras, modified webcams, video cameras or straight digital cameras. Apart from static displays of previously obtained images, the crowd was enthralled by daytime live video of the Sun and Moon, and evening views of the Moon and Jupiter. This enabled several people to view through an instrument simultaneously, with details (e.g. the Straight Wall and Alpine Valley on the Moon) easily being identified and pointed out to them by knowledgeable individuals.
- The largest sized instrument this year was Tim Cooper's 16-inch, for which this was the

first excursion from his observatory in 11 years. It's a monster that deservedly attracted considerable attention. Who will dare to top this next year?

The weather was again perfect – thank goodness. Whereas last year it was rainy the week before and cleared for the day, this time a cold front rolled in the next day, bringing cloud and low temperatures.

We appreciate the effort it took for people to bring their precious (and sometimes physically challenging) equipment, risk putting it in front of the public, and manning their stations for the day. Similarly, there were a large number of unsung heroes who helped behind the scenes with organising and running the day. For many, this was second time round. In order for this event to continue to survive, it is necessary to encourage exhibitors to return, preferably with new items. This is quite a commitment, which raises the question of how to induce them to do it again (and again...)? Our answer was to introduce a 2-part reward system. This added some flavour and professionalism to the day and came as a pleasant surprise to many. We hope that it will give the amateur telescope makers / gadgeteers as well as those embarking on observing or imaging programs the incentive and motivation to continue with projects old and new, spur them on to greater heights, and ensure growing numbers of exhibitors. So how did this work?

Firstly, the judges inspected the amateur-built exhibits. On the basis of our deliberations, we were pleased to be able to hand out some quite substantial “merit awards” such as eyepieces, tools and book vouchers, for which we had obtained sponsorship. These awards were based on quality of workmanship and execution, innovation, ambitiousness of the project and practicality of the finished result. Unfortunately we were only able to obtain eight prizes of sufficient worth to dish out. Certainly there were several more whom we considered deserving - a few of these we felt compelled to mention at the prize giving.

Secondly, there is the question of how to reward those who do not have the resources to excel at telescope making, or who took the trouble to bring equipment that they had bought? And what of the helpers? The presence and involvement of

these participants is equally appreciated, but they cannot be “judged” or ranked in any way. Our solution was to have two “lucky draws”, in which a number of prizes were randomly assigned. The one draw was for all exhibitors (except the winners of the merit awards), while the other

draw was for the helpers. Again, we would have liked to give out more, but distributed the available items as fairly as possible.

Let’s do it again next year!

Telescope Makers’ Competition

Judged by: Chris Stewart, Brian Fraser and Dave Blane

Criteria applied: Quality of workmanship and execution,
Practicality, Innovation, Ambitiousness

The Winners (listed in no particular order)

Name	Judges’ comment	Prize	Sponsor
Peter Fyfe	Excellent example of “standard” Dob	Barlow lens	Telescope SA
Peter Baxter	Exceptional quality wooden Dob with drawers	Meade Electronic eyepiece	Lynx Optics
Chris Lubbe	Wheelchair-accessible pier (with Peter van Laun)	R250 Book Voucher	Exclusive Books
Jan Schut	Exceptional Workmanship 6” Newtonian on Equatorial Mount	15mm Eyepiece	Photoweb SA
Francois Nortje	Equatorial Platform	40mm Eyepiece	Photoweb SA
Scotty Naughtin	Combination Newtonian Finderscope/Ballscope	Red-Dot Finder	Telescope SA
Frikkie Le Roux	6” Newtonian on Split Ring Equatorial	Toolset	ChristensenTools
Geoff (from Durban)	Mirror grinding machine built at zero cost	Toolset	ChristensenTools

Special Mention (listed in no particular order)

Name	Judges’ comment		
Keith Liddle	Low-cost Observing Chair		
Johan Swanepoel	Truss tube Dob		
Wayne Mitchell	Mount for Refurbished Dynamax		

A Perspective by Chris Penberthy

Lu and I arrived at about 10:30, visited the Info desk where we collected our Scope-X 2003 sweatshirts and then decided to do a quick dash around the exhibitors before starting our own stint tour of duty on said Info desk.

There seemed to be a lot more on view in the grounds this year, and a fair amount of thought must have gone into some of the exhibits. We didn't get to see anyone sweating away at the mirror-grinding demo - I guess they also needed a bit of a break! Some nice looking scopes both commercial and homemade were dotted about - some of the latter quite impressive and obviously "created" with a lot of sweat and tears. We were suitably impressed with one that had a round wooden tube made of individual strips of wood - a beautiful 'scope this. Eventually we made our way to Bruce's setup with that great 12" LX200 (under cover) and a smaller ETX out in to open and tracking the Sun. We peeked through the 'scope and viewed a couple of Sunspots one of which was quite sizable. Lu's comment - "hmmm Bruce - looks like some dirt on your lens".

I snapped a few images as we went around including one of our colleagues from North of the Jukskei - always nice to see them. As time was not too plentiful, we had to make a dash for the Info desk where we had to take over at 11:00. On

the way, we saw a Mirror making machine - quite interesting.

After a busy(ish) 2 hours, we handed over to our successors and had quick look at the exhibits we'd missed on the first tour - stopping off at Dave Hughes' Dob. Also trained on the Sun (and guess what - the same speck of dirt on the lens). Those Sunspots are very interesting and we speculated on their sizes relative to the Earth.

Our son and daughter-in-law arrived and after they signed up to join the society we took another cruise around the exhibitors. This time we had a look at those inside the hall as well - a pity commercial 'scopes are still so darned expensive - they really do make it easy for the amateur but at a hefty price of course!

We also had an interesting chat to Emmanuel Petrakakis from Mozambique who runs a small hotel and restaurant on the coast and also has a small farm suitable for viewing. Maybe we should organise a visit where we can Scuba diving during the day and view the stars at night (and sleep when we get back to Gauteng!!!)

All-in-all a really good effort - I think overall it was better than last year - but without detracting from the excellence of our first Scope-X.

The ATM demonstrations, by Vincent Nettmann

"How did it go with the Amateur Telescope Making demo?" Well, it just didn't stop the whole day! Visitors were amazed to see what "scrounged" bits and pieces go into a homemade telescope. (Thanks to Mike Fletcher for his under-construction telescope.)

"How do you get the curve on the mirror?" was the most frequently asked question.

We demonstrated the grinding technique on a 6-inch mirror, and then let our visitors have a hands-on go at it. "The answer to your question

is, you are now making the curve yourself – that's how!"

The next most frequently asked question was, "When can I start?"

Thanks to Peter Fyfe, Peter Fyfe Jnr., Scott Naughtin, Keith Lou, Trevor Troye, Dave Hughes and others for sharing their time and knowledge with our visitors.

Why not join us?

The Auditorium Presentations, by Dave Gordon

The opening presentation was delivered by Jim Knight, former Director of the Solar Section of ASSA, with the topic "Solar Observing". The main structure of Jim's talk centred around the various forms of solar observing, beginning with observations without optical aid (as may be the case with solar eclipse viewing) to sunspot counting with the aid of a small telescope. The audience thoroughly enjoyed learning how to identify sunspot groupings, performing a count, recording the results and the submission thereof to the AAVSO. The actual process of counting sunspots was a popular topic during open question time.

Jim is a dedicated solar observer (and one of only a handful in the Southern Hemisphere) who maintains an average of 22 observing days per month – the envy of many amateur astronomers who are forced to practice their branches of astronomy at less than convenient times of the day.

The topic of "the H.E.S.S. Gamma Ray Telescopes of Namibia" was presented by Professor Okkie de Jager of the Department of Physics, Potchefstroom University. A fascinating insight into this exclusive and (currently) fairly restricted branch of astronomy. Professor de Jager started his presentation with a description of the electromagnetic spectrum and very succinctly explained the importance and relevance of gamma ray observations.

The H.E.S.S. project is an array of imaging atmospheric Cherenkov Telescopes used for the investigation of cosmic gamma rays in the 100 GeV energy range. The name H.E.S.S. stands for **H**igh **E**nergy **S**tereoscopic **S**ystem. H.E.S.S. is located in Namibia near the Gamsberg, an area well known for its excellent viewing conditions. The first of the four telescopes of Phase I of the H.E.S.S. project went into operation in 2002; all four should be complete by 2004.

Midday saw the much anticipated and well attended presentation by Dr Claire Flanagan, Director of the Johannesburg Planetarium, entitled "People In Space". Dr Flanagan's easy and conversational presentation style was a delight for her audience who interacted freely and delightedly with her. Her ability to "play with the numbers" created an entertaining and informative look into

what it would be like to say, stand on the surface of a pulsar. It would take more than 40 years worth of accumulated human energy to lift one's foot just one centimetre from the surface of a pulsar.

Dr Flanagan also demonstrated, through numbers, the difficulty of reaching the next stellar system (alpha Centauri) and the amount of energy required to achieve 85% of the speed of light.

The lunchtime presentation was conducted by Dr Matie Hoffman of the Department of Physics, University of the Free State. The title of his talk was "Recent and Future Developments for Optical astronomy in SA: Boyden and SALT". As the title suggests, the presentation was in two parts, the first being a type of progress report on the development of the SALT telescope at Sutherland. The sheer enormity of the project, and specifically the telescope structure, was extremely well explained and demonstrated through the use of excellent graphics.

Dr Hoffman's prowess with PowerPoint was demonstrated when he led his audience on a virtual reality tour of the Boyden Observatory and facilities near Bloemfontain. He simply clicked on key areas on an aerial photograph of the site which then drilled-down to that particular facility and its features. Thanks to the refurbishment of the 1,5m telescope, during the period leading to the Comet Shoemaker-Levy impact of Jupiter in mid-1994, this facility is very active and doing "useful science". Of particular note is the now very active solar observatory at the site.

The following captive title ensured a strong audience contingent for Dr Mike Gaylard's presentation: "Is astronomy useless? No, it can tell you what the time is and where you are, courtesy of Space Geodesy at HartRao". If there was any doubt in the minds of the audience as to the importance and relevance of the Hartebeeshoek Radio Astronomy Observatory telescope, this was well and truly reversed by the end of the presentation. The work being performed at the site is diverse; from monitoring a plethora of blips from distant pulsars, measuring the speed at which the African Continent is drifting, to maintaining contact with and calibrating the swarm of global positioning satellites within the vast clutches of the radio telescope. Dr Gaylard ended his presentation

by inviting any interested persons to tour the HartRAO observatory site – a visit that, if his talk was anything to go by, should prove fascinating and enlightening.

The presentation that many had been eagerly awaiting: Professor David Block, Director of the Cosmic Dust Research Laboratory, University of the Witwatersrand. The title: “Penetrating Masks of Cold Cosmic Dust”. The moment Professor Block started addressing a capacity audience in the auditorium, one understood his popularity as a much sought after motivational speaker and public figure. His captivating style of delivery and clever manipulation of prose held an audience fascinated and enchanted for fully an hour.

Professor Block likened the masks of cosmic dust that populate galaxies to that of the obscuring effects of a dense aerosol spray. Outstanding graphics and photographs illustrated this pervasive material as being the main culprit for astronomers not being able to see the true features of a galaxy. His analogy of the wearer of a facemask powerfully punctuated his point that the true face of a galaxy cannot be predicted from the visual characteristics gleaned by optical telescopes operating in the visual spectrum. It is only when telescopes, operating in the infrared part of the spectrum, strip away these masks of cosmic dust, that we begin to see the true structural characteristics of galaxies.

A very young member of the audience bravely asked Professor Block “Where does the dust come from”. Only his years of oratory skill and knowledge could possibly do justice to that one from a pre-teenager.

Who possibly would be brave enough to follow on after a presentation of Professor Block’s calibre? Sarah Buchner, astronomer at HartRAO, would. Her presentation was entitled “Interpreting the results from NASA’s Wilkinson Microwave Anisotropy Probe (WMAP)”. A stunningly prepared and well-researched insight into the period immediately following the big bang; specifically dealing with the cosmic background radiation currently being studied in the microwave segment of the electromagnetic spectrum.

Sarah proposed answers to such fetching questions as the age of the universe, the shape of the universe and the expansion rate of the universe (an updated and revised Hubble Constant). She also attracted some challenging questions from the audience, such as “Where, in fact, is the actual point of the big bang and why is it not possible to see it?” A fascinating, insightful and thought-provoking presentation.

Emmanuel Petrakakis, hotelier and restaurateur, is passionate about Mars. After presenting a paper at the founding convention of the Mars Society in Boulder, Colorado, Emmanuel returned to Southern Africa to form a branch of the Mars Society here. His polished and well rehearsed presentation started with a brief tour of the red planet followed by a history of unmanned flight to Mars. The final segment took the form of a practical and workable proposal for manned missions to the planet, complete with schematics of habitation modules and plans for extensive exploration and safe return. A delight to the audience, judging from the applause and enthusiastic post-presentation response.

The final presentation of the day was held at around 7pm, after the prize giving. I was unable to attend Richard Wade’s talk entitled “Archaeo-astronomy of Great Zimbabwe”. However, I was pleasantly surprised by the audience turnout, given the lateness of the hour. Richard is owner of the N’Kwe Ridge Observatory, near Pretoria. Given his present involvement with a TV series, a doctorate, palaeontology, astrobiology, archaeology, meteorites, crater, anthropology, and the writing of a book, his talk promised to be nothing short of enchanting. And he delivered on that promise. I spoke with a few audience members as they filed out of the auditorium at the conclusion and the responses were: “fantastic”, “amazing”, “interesting”, and “I’ve got to visit N’Kwe Observatory and speak more with this man”.

One of the main objectives of ScopeX is the education of the public in astronomy. Did we achieve that objective through the presentations? I propose a resounding “Yes!” and more. The presentations entertained, fascinated, enthralled and challenged audiences to THINK COSMIC THINGS.

Our visit to Albert and the Prince Albert Observatory

A week's holiday beginning in Port Elizabeth and ending at Wilderness on the Garden Route gave us an opportunity to include a visit to the private observatory of Albert Jansen in the Karoo village of Prince Albert, north of Oudtshoorn. We had driven that day from Port Elizabeth and had underestimated the time it would take for us to complete the journey. Between Oudtshoorn and Prince Albert we had opted for the longer tarred road through the spectacular Meiringspoort Pass with the road winding its way across 23 drifts along the bottom of an 18 km gorge with towering rock faces on both sides of the road.

We arrived in Prince Albert after dark and expected to be able to find our B & B without difficulty, as the village doesn't have more than a dozen or so named streets, but had to ask at the local information centre which was still open and very welcoming.

We had earlier in the afternoon contacted our host who explained that she would be out at about the time of our anticipated arrival, but that she would leave the door unlocked and the key on the table! Such a pleasant surprise for us security conscious Jo'burg-ites.

We phoned Albert Jansen and told him we would be around soon after we had had a bite to eat.

Shortly after 8pm we were greeted by Albert at his home on the outskirts of the village. We were immediately struck by his infectious enthusiasm and considerable knowledge of astronomy. He was at one time director of the Leiden Planetarium in Holland and later a lecturer in astronomy at the Technical College in Amersfoort. Deciding to emigrate to South Africa fulfilled his life-long ambition to be able to enjoy the dark unpolluted skies of the Southern hemisphere with its myriad of deep sky splendours.

On our first night we were shown many objects beginning with a view of Jupiter and its Galilean satellites projected on a black and white monitor by a video camera attached to his LX200 GOTO telescope. This method of viewing is particularly helpful if there are several visitors as all can see at the same time and the image can be quickly

zoomed in and out. The belts on the giant planet were readily visible but the great red spot (which shares the ten hour rotation period of the planet) was out of sight.

We also observed the triple star Beta Monocerotis: components 4.7 / 5.2 / 6.1 mag, separations 7.3" for the wide pair and 2.9" for the close one. All three are B2 main sequence stars with emission lines. Discovered in 1781 by W. Herschel who called it "one of the most beautiful sights in the heavens".

We were surprised to be joined by a former member of the Johannesburg Centre, Nigel Wakefield, from Bristol in the UK, out on a visit to SA.

We now turned our attention to Albert's 16 inch Dobsonian and took turns observing the globular clusters in Centauri and 47 Tucanae. At 150x some individual stars could be resolved but we agreed that the more spectacular views were to be had at lower magnification as the full extent of the object could be seen at a glance. By this time the moon had set and the Milky Way was spread across the sky in all its splendour. The coal sack and the large Magellanic cloud were easily seen as naked eye objects.

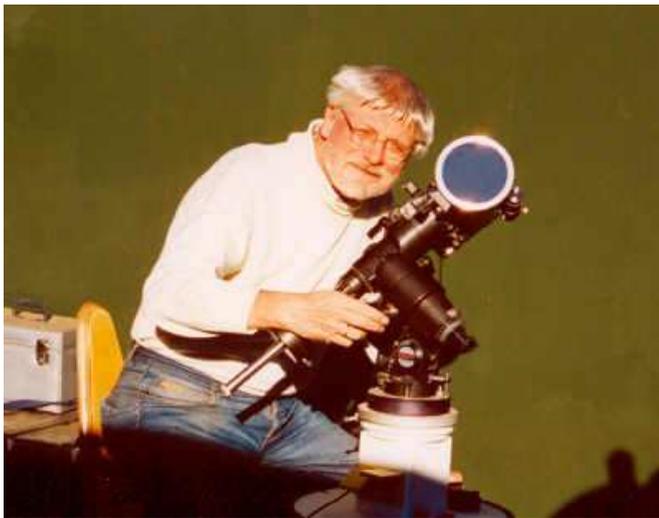
On our second night we started by exploring the Orion constellation and marvelled again at the Great Nebula M42 in the sword with the Trapezium showing prominently in the centre surrounded by a distinctly greenish nebulosity provided by the great light gathering power of the 16inch Dobsonian. The images were rock steady as the telescope was tracking in R.A. with the aid of a home-made Poncet mounting. Albert pointed out that this telescope gave one the satisfaction of hands-on astronomy as one could bodily shift the telescope with two hands to the desired direction. This evening we marvelled at Herschel's Jewel Box NGC 4755 in Crux with its distinctly coloured stars. The Eta Carinae Nebula revealed its dusty lane.

We marvelled that the second magnitude star Delta Velorum in the false cross asterism had escaped knowledge of its variability until as recently as 1997 when an observer in Buenos

Aires had noticed a 0.3 magnitude dip. Subsequent observations, including those done by Albert, contributed to our knowledge that this star is an eclipsing binary with a period of 45.15 days and a half magnitude dip in brightness of only a few hours.

As Orion set and the constellation Scorpius rose higher in the sky we were treated to splendid views of M6 (the Butterfly Cluster) and M7 as well as the Open Cluster NGC 3532 in Carina now listed in the Caldwell catalogue of deep sky delights of Patrick Moore as No. 91

On the morning of May 7th we again joined Albert at his observatory, this time for the transit of Mercury. Unfortunately we could not see either the first or second contacts as his location was too far west. Consequently the transit was already in progress as the sun climbed over the hills on the horizon.



The subsequent stages of the transit were photographed by Albert through his 4 inch solar telescope.

The planet Mercury only 12 arc seconds across was easily seen on my own 49 mm image of the sun. This was projected onto a screen about half a metre behind the eyepiece of a telephoto lens gleaned from an old 8 mm cine camera. The image of Mercury was sharp in comparison with the fuzzy edge of a prominent central sunspot.

We were not equipped to record any contact timing of Mercury but were reminded that the observations in the mid 19th century revealed timing anomalies as large as 40 seconds, which were ascribed to perturbations arising from a hitherto undiscovered planet (suggested name Vulcan) in an orbit even closer to the Sun than Mercury.

However, no such planet was ever discovered and it was not until Einstein's General Theory of Relativity, which provided a refinement to basic Newtonian mechanics, that a solution to the problem was found.

We heartily recommend a visit to the Prince Albert Observatory: a worthwhile detour from any journey to Cape Town or the Garden Route.

Margaret & Graham Tremeer

Spotlight: An Exploration Extravaganza Jet Propulsion Laboratory

http://www.jpl.nasa.gov/solar_system/features/2004roundup.cfm

May 19, 2003

Mission controllers at NASA's Jet Propulsion Laboratory in Pasadena, Calif. are ramping up for an era of unprecedented space exploration. The Lab is poised to launch and direct a fleet of space probes that will, among many other things, crash into the heart of a distant comet, snatch particles of the solar wind, rove across Mars to search for evidence of liquid water, and descend through the atmosphere of Saturn's moon Titan to explore what reminds many scientists of an early Earth.

"The world will have a front-row seat to one of the most exciting periods of solar system exploration in history," says Dr. Charles Elachi, JPL director. "Never before have so many exciting and challenging missions to study so many different parts of the solar system and beyond converged within such a short time frame. It's an exciting time for NASA, JPL, the nation and the world."

This summer's launch of two identical rovers to Mars within days of each other will have everyone seeing double on the red planet. In January of 2004, the two Mars Exploration Rovers will attempt to land on opposite sides of the planet and explore diverse, though equally intriguing sites for evidence of past and present liquid water - an ingredient thought vital to any life processes.

Among the advancing JPL fleet is the Space Infrared Telescope Facility, slated to launch at the end of this summer. This new space observatory will pierce the thick dust that blankets much of the universe and then provide spectacular views of some of the earliest galaxies and stars in cosmic history. The telescope's super-sensitive infrared vision will also look around nearby stars for swirling debris discs that may represent planetary systems in the making.

The veteran Galileo mission will come to a grand finale this fall when engineers deliberately plunge the spacecraft into Jupiter's vaporizing atmosphere in September. They're doing this to avoid any possibility of future contamination of Jupiter's scientifically interesting moon Europa.

In January of 2004, the Stardust space probe will encounter comet Wild 2 and snatch comet dust from this celestial wanderer for return to Earth in 2006. Scientists hope to learn more about the early history of our solar system from this cometary sample return.

Then in July of 2004, after a seven-year journey across the solar system, the Cassini spacecraft will be the first space probe to orbit the ringed planet Saturn. Just six months later, Cassini's Huygens probe will descend through the rich atmosphere of Saturn's biggest moon, Titan, a world with possible oceans of liquid methane and some conditions similar to primordial Earth.

The Genesis spacecraft is currently soaring beyond Earth's orbit, collecting particles of the solar wind. Such pristine samples from our Sun should help scientists understand more about its chemistry and how the material it ejects may affect us here on Earth. These solar samples will return to Earth in September 2004 with a dramatic mid-air scoop of the spacecraft's sample return capsule by helicopters over the Utah Test and Training Range. This is NASA's first sample return mission since the Apollo Moon landings wrapped in the early seventies.

Don't miss the extraterrestrial fireworks show on July 4, 2005, when the Deep Impact spacecraft will send a small probe to literally crash into the heart of Comet Tempel 1. The main spacecraft will observe this cosmic collision from a distance, then analyze the ejected material. In their series of encounters, JPL's robotic space probes may lead us to a string of scientific discoveries, some of which may forever change our views of the universe and our place in it.

ESA News

● Comet-chasing mission Rosetta will now set its sights on Comet Churyumov-Gerasimenko.

During its meeting on 13-14th May 2003, ESA's Science Programme Committee decided Rosetta's new mission baseline.

Read the article:

http://www.esa.int/export/esaCP/SEMLSFS1VED_index_0.html

Or visit the special Rosetta site:

<http://www.esa.int/export/esaMI/Rosetta/index.html>

● With a week to go to the launch of ESA's Mars Express, you can read about the final preparations for launch in the latest installment of the Mars Express launch diary at:

http://www.esa.int/export/SPECIALS/Mars_Express/SEMKD9S1VED_0.html

Follow the launch countdown and watch the launch live on the web at:

<http://www.esa.int/marsexpresslaunch>

● Travelling through space and exploring new worlds fires most young peoples' imagination. ESA's new-look education site for students and teachers, shows how fascination with space can be used to increase interest in all areas of science and technology and increase the number of students who go on to study science, engineering and technology. Read article:

http://www.esa.int/export/esaCP/SEMCA8S1VED_index_0.html

Visit the new education site:

<http://www.esa.int/export/esaED/index.html>

Chairman's Chat

May 16, 5am - the morning of the lunar eclipse. I had just crawled out of a nice warm bed to pop outside for a quick peek at the Earth's shadow cast on the surface of the moon. The thermometer in the observatory was taunting me with a 5° Celsius smirk. I shivered and wrapped the scarf tighter around my neck and pulled the beanie further down over my freezing ears. As the middle of the eclipse approached, I began to realise that this was one of the darkest lunar eclipses I had yet seen. A spur of the moment decision: I had better take a picture of this!

Frantically, I unwrapped the telescope from its bed clothes and set about attaching the focal reducer, camera adapter and T-mount. I realised the camera was in the main house so I dashed back to retrieve it. Panting and back in the observatory, I realised the cable-release was also in the house – dash number two. I wrestled with the scope and camera, trying to align and focus on a rapidly westward descending moon that was now languishing in full umbra. Panic stations: what exposure time for this very dark eclipse? Dash number three back into the house to retrieve Michael Covington's "Astrophotography for the Amateur". I groaned as Covington declared 1 – 3 minutes exposure. I had a mere 10 or so minutes before the moon settled behind the westward wall of the observatory.

Astronomy IS exciting. One never knows what opportunities and surprises the celestial sphere has to offer. Whereas, there are obvious benefits to careful pre-planning for a night with the telescope, there is no reason why one shouldn't try unrehearsed and impromptu experiments.

There is a tremendous personal satisfaction in recording what your eye has fleetingly witnessed, whether it be using photographic film, digital cameras, web cameras or even simply sketching on a piece of paper. In fact, the last method leaves the greatest and longest impression because it is as the mind's eye has interpreted the celestial image.

It was during my early days in astronomy that I spend many hours simply plotting the brighter constellations on separate pieces of paper, viewing each star separately through the telescope, then painstakingly labelling the stars from a star chart. Those self drawn charts (some

quite amusing to look back on now, I might add) assisted me immensely in learning the constellations.

A few evenings back I was out taking a picture of the last quarter moon. While thumbing through a star chart to verify that Achernar in *Eridanus*, was in fact the bright star rising in the south, I realised that I had never visually identified the constellation of *Indus*, the Indian. Just four stars make up this rather faint T-shaped constellation, yet I was surprised at how easy it was to identify the Indian nestling amongst its feathered friends: the crane, the peacock and the toucan. A little further background reading revealed that, at only 11,3 light years away, *epsilon Indi* is one of the closest stars to the sun and one considered a likely candidate for hosting a planetary system. In 1972, the Copernicus Satellite searched unsuccessfully for laser signals from this star.

Talking about opportunities and surprises, by the time you read this, shuttle astronaut, Marsha Ivins will have presented a talk to members of the society at a breakfast on the 28 May. This was an impromptu opportunity that we were only able to secure after you had already received the May edition of *Canopus*. For those members who knew nothing about it, now may be a good time to subscribe to the ASSA mailing list advertised on page three of this magazine each month, or at least visit the web site from time to time.

There are already four star parties scheduled for you (Montrose, Skeerpoort, Lady Grey and Richtersveld). In addition, we have a ASSA home clean-up scheduled for 21st June, a centenary to celebrate, a Mars closest approach in August, astronomy beginners classes before every monthly meeting, a planetarium treat this month, a line-up of fascinating speakers for the months ahead ... and no doubt, a host of impromptu things astronomical that you will only get to know about by staying in touch.

Most astronomers follow the wisdom of philosopher Yogi Berra, who observed "You can see a lot by looking. Although looking is no guarantee of seeing something, not looking will always ensure not seeing!"

Dave Gordon

MARS EXPLORATION ROVER SPACECRAFT UNDERGO BIOLOGICAL TESTING AND CLEANING PRIOR TO JUNE LAUNCHES

Kennedy Space Center, Florida.
KSC Release No. 37 - 03

What do NASA's soon-to-be-launched Mars Exploration Rover (MER-1 and MER-2) spacecraft have in common with the Viking and Voyager spacecraft launched decades ago? Besides being interplanetary explorers, they will be among the biologically cleanest spacecraft ever launched from Cape Canaveral Air Force Station.

Making sure the spacecraft are as biologically clean and contamination-free as possible before they leave Earth is NASA's planetary protection (PP) policy. It protects other solar system bodies from Earth life and protects Earth from extraterrestrial life that may be brought back by returning space missions. NASA's policy is based on the most recent understanding of planetary conditions and biology, and regular recommendations from the US National Academy of Science.

"Keeping the spacecraft as clean as possible before, during and after launch is very important for any science instruments searching for organic compounds on the surface of other planets," said Laura Newlin, Jet Propulsion Laboratory (JPL) engineer and Planetary Protection (PP) Lead for the MER missions. JPL's Biotechnology and Planetary Protection Group seeks to advance spacecraft cleanliness, sterilization and validation technologies for NASA's solar system exploration missions.

"Up to 300,000 spores are allowed on the exposed surfaces of the landed spacecraft," said Newlin. "That many spores would fit on the head of a large pin."

A companion requirement to this is the average spore density on the surfaces must be less than 300 spores per square meter (28 spores per square foot). There are approximately 4500 square meters (approximately 48,000 square feet) of surface on each MER spacecraft, including the cruise stage.

When the spacecraft arrived at KSC from JPL in February and March, they were transported to the Payload Hazardous Servicing Facility in KSC's Industrial Area. Prior to that, the highbay and

ground support equipment were cleaned, sampled and re-cleaned to reduce further biological contamination when the spacecraft arrived.

Both spacecraft have since undergone extensive alcohol-wipe cleaning and bio-testing processes. They were disassembled and cleaned to remove any contamination that may have occurred during the cross-country transport. During reassembly, JPL PP team members sampled surfaces of both spacecraft to check for microbial spores.

Culturing of the samples was performed in several KSC life sciences labs using equipment from JPL or provided by KSC including media claves, sonicators, water baths, incubators, microscopes, bio-safety hoods, and a large magnified colony counter.

"Currently our total spore count on the surface of both MER vehicles is comfortably under 200,000. So we are below the allowable level," Newlin said.

Other PP strategies exist for MER surfaces that are inappropriate for the traditional cleaning method. These include dry heat microbial reduction of the hardware in a dry environment at 125 degrees Celsius (257 F.) for five hours. The process is performed piece by piece on large surface areas that can tolerate the temperature, such as thermal blankets, airbags, honeycomb structures and parachutes in their cans.

A High Efficiency Particulate Arrestor (HEPA) filter is also used to filter out 99.97 percent of particles that are 0.3 microns or larger on MER's electronic boxes and the rover body. These permanent fixtures will also help filter out the Martian dust when the MER spacecraft land on Mars. Spacecraft propellant lines were also precision cleaned.

According to Newlin, the PP team worked with the spacecraft design engineers to determine PP strategies, what hardware should be cleaned and what hardware would require other PP approaches, all of which were integrated into the design, fabrication, and assembly of the spacecraft.

A couple of pictures from the last Monthly Meeting





An open letter to all who participated...

Hello all,

On behalf of the ASSA Johannesburg Centre, I would like to thank you for your kind efforts and involvement in making the second annual ScopeX event such a success. Our mission was to have a special day where like-minded astronomy enthusiasts could get together and mingle informally. Apart from getting together those of us already active in this field, we wanted to ensure the long-term survival of our hobby by bringing in new blood. That of course implied a wide scale promotion of astronomy in general and telescope making in particular. While there is always room for improvement, I think we again succeeded admirably on all counts. It was extremely gratifying to see the "old timers" giving of their wisdom to the benefit of the newcomers. We hope you enjoyed the day and will be prepared to participate again.

To our Invited Speakers:

Again, thank you. That you selflessly gave of your time to share ideas, concepts and experience is most valued. Feedback has been extremely encouraging and many people commented that they came away with new knowledge and a renewed sense of wonder. That is a rare experience in most people's lives.

To our Commercial Exhibitors and Sponsors:

It was extremely interesting to note the variety that was so professionally and attractively displayed. Not only was this a counterpoint to our home-built instruments, but it gave many an appreciation of what really is available on the local market. We thank you for your sponsorship, which contributed to making the event possible. We trust that the day was as fulfilling for you as it was for us.

To Demetri and Friends at the Military History Museum:

What a wonderful venue! Clean and neat, with spacious lawns on which to array our instrumentation, fascinating reminders of our military history, a calm ambience, safe parking, nice auditorium... the list could go on. Thanks for once again accommodating us and going that extra mile to make this an event to remember.

To the Amateur Telescope Exhibitors:

A special thank you for bringing your beloved equipment and exposing it to the public. This always entails a certain risk, but without it there would have been no real exhibition. I know I am not alone in having enjoyed the diversity of instruments and approaches; there were so many interesting features to be examined and lots of ideas to spur us on. Thanks too for your patience in fielding endless streams of questions from the public, and generally spreading your enthusiasm. This is what it takes to ensure the local growth of our hobby. We are particularly indebted to those who came from Pretoria and even as far afield as Bloemfontein, Dundee and Durban to be with us.

To Vince and his Team at the Telescope Making Demonstration:

A big thank you for a very well-run and extremely popular exhibit. Judging by the constant crowds surrounding you, I would be surprised if you haven't lost your voices! Having practical demonstrations of a hands-on nature, supplemented by diagrams and examples of work-in-progress, went a long way to demystify the process of building a functional instrument. I am certain that many people who never before had even an inkling that such a thing might be possible, will find their way into the telescope making class. Tangible proof of the value of your exhibit, is that people who were previously deterred from astronomy by the high cost of commercial instrumentation will soon find themselves enjoying the splendor of the night skies through a telescope of their own making. And that is something special, of which you can be proud.

To all the "behind the scenes" Helpers:

Without your assistance - be it in the initial organisation, helping at the information desk, selling raffle tickets and hotdogs, or manning the cafe, guiding visitors to the exhibits/auditorium, or whatever - the event would not have been as complete, fulfilling or successful as it was. To those not in the know, you comprise the "unsung heroes"; but believe me, there are many of us who do know and appreciate just how hard you worked. Your efforts, no matter how unglamorous, oiled the wheels on the day and were every bit as important as the high-profile activities. Your support was essential and very much appreciated: thank you. Not only are we grateful for the help of those whose roles were pre-arranged, but we are also particularly appreciative of those of you who, unasked, just pitched in and helped wherever you saw a need.

To ASSA members, friends, visitors, and the general public who took the time to visit on the day:

Thank you for filling the ranks. We were proud to show off our equipment and share with you our appreciation for the skies. We trust you found it an interesting day and a worthwhile use of your time. We would love to have you back again next year, hopefully as an exhibitor!

To some of you, the awards and prizes that we gave out came as a surprise. It was our way of rewarding in some small measure your effort and enterprise, a tangible token of our appreciation. Although we would of course like to have given more, we did the best within our means – random selection therefore had to play its part to some degree.

We plan to put together a short report on lessons learned from this second ScopeX. So, while the day is relatively fresh in your mind, please let me have your views. We need to know what requires improvement, and also what you think went well. Suggestions are most welcome. With your input, we can adjust our planning for next year. This way, we can not only keep on meeting our mission as stated above, but also (within the limits of feasibility) mould the event in such a way as to continue meeting your high expectations and make it more interesting. We will happily send you a copy of the report in due course if you wish.

Please address your responses to mwgringa@mweb.co.za and copy lerika@icon.co.za

Thanks again. We hope we can once more count on your contribution next year, for another enjoyable day among friends.

Regards,
Chris Stewart

Chris Stewart
Vice Chairman,
ASSA Johannesburg Centre
Personal website:

<http://home.mweb.co.za/mw/mwgringa/>

The Sky this Month

June 2003

dd hh	dd hh
1 20 Saturn 3.4 S of Moon	19 08 Uranus 4.7 N of Moon
3 08 Mercury greatest elong. W(24)	20 20 Mercury 0.5 S of Venus
5 06 Jupiter 4.4 S of Moon	21 00 Mars 3.2 S of Uranus
7 13 Uranus stationary	21 15 LAST QUARTER
7 21 FIRST QUARTER	21 19 Solstice
9 20 Pluto at opposition	24 14 Saturn in conj. with Sun
12 22 Moon at perigee	25 04 Moon at apogee
14 11 FULL MOON	28 13 Venus 2.2 S of Moon
17 20 Neptune 5.1 N of Moon	29 02 Mercury 2.1 S of Moon
18 18 Venus 4.8 N of Aldebaran	29 10 Saturn 3.5 S of Moon
19 06 Mars 1.6 N of Moon	29 18 NEW MOON

July 2003

dd hh	dd hh
1 00 Mercury 1.5 N of Saturn	17 09 Mars 0.5 S of Moon Occn.
1 01 Mercury greatest brilliancy	21 08 LAST QUARTER
2 20 Jupiter 4.4 S of Moon	22 20 Moon at apogee
5 10 Earth at Aphelion	24 14 Venus 6.2 S of Pollux
5 10 Mercury in superior conjn.	26 01 Mercury 0.4 N of Jupiter
7 03 FIRST QUARTER	27 00 Saturn 3.9 S of Moon
8 08 Venus 0.9 N of Saturn	28 18 Venus 3.5 S of Moon
10 17 Mercury 5.1 S of Pollux	29 07 NEW MOON
10 22 Moon at perigee	30 12 Mercury 0.2 N of Regulus
13 20 FULL MOON	30 13 Jupiter 4.3 S of Moon
15 06 Neptune 5.0 N of Moon	30 23 Mars stationary
16 17 Uranus 4.5 N of Moon	31 01 Mercury 4.8 S of Moon

LOCAL TIMES of RISE and SET for the MAJOR PLANETS, 2003

Site Location: Long. +28.0 deg. Lat. -26.0 deg. Local Time - UT +2.0 hrs.

Date	Sun		Mercury		Venus		Mars		Jupiter		Saturn	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
Jun 10	06.52	17.22	05.03	16.02	05.24	16.11	22.23	11.31	10.36	21.31	07.44	18.15
Jun 20	06.55	17.23	05.37	16.16	05.41	16.17	22.03	11.07	10.02	21.00	07.10	17.42
Jun 30	06.57	17.26	06.30	16.55	05.57	16.27	21.41	10.40	09.29	20.29	06.36	17.08
Jul 10	06.56	17.30	07.23	17.52	06.12	16.40	21.14	10.12	08.56	19.58	06.02	16.34
Jul 20	06.54	17.34	07.55	18.45	06.24	16.56	20.43	09.40	08.23	19.28	05.28	16.00
Jul 30	06.49	17.39	08.07	19.23	06.33	17.13	20.06	09.04	07.51	18.59	04.54	15.26