

# CANOPUS

**The Astronomical Society of Southern Africa**

**Johannesburg Centre**

**Monthly Newsletter for April 2002**

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

## Editorial

Did any of you manage to visit the ASSA Jo'burg Centre stand at the Hobby-X show a few weeks back. It was really quite an amazing effort, considering the short amount of time we had to set it up. A great word of thanks is due to our vice-chairman Dave Gordon for his foresight, and to Chris and Gill Stewart for their efforts in helping Dave to set up what turned out to be a really good advert for the Society. A lot of interest was sparked by the stand, and membership took a sudden leap upward - this can only be good for the society as a whole. Last and not least, another word of thanks is also due to those members who took the time to join Dave on the stand and helped to promote the Jo'burg Centre. This to my mind is a forum that should become an annual event, with as many members as possible lending a hand.

And talking of annual events; what it is hoped will become a regular exhibition for the Jo'burg Centre, ScopeX 2002 ( and hopefully 2003...2004...etc... ) will be taking place on the 18<sup>th</sup> of May 2002 at the War Museum just next to the Johannesburg Zoo. It will consist of an exhibition of telescopes followed by a Star Party as soon as it darkens ( and of course the old proviso - *weather permitting* ). There will be place for vendor displays as well so we will see both home-made and commercial telescopes on display.

Venus is now quite nicely visible in the early evening sky and Jupiter and Saturn still there until fairly late in the evening. A newcomer to our skies - comet Ikeya-Zhang is also granting us a fleeting display and it seems that we can expect a fairly reasonable view of this speedy visitor.

**Eben van Zyl** opens the book on a few more techniques used by Kepler in calculating planetary orbits and such and gives us some insight to the brilliance of the man. The astronomers of old surely managed the get and awful lot of work done and without the help of computers no gal! **Brian Fraser** tells us what's happening for the next 2 months and this includes tables of the rising and setting of the Sun and 5 major planets. **Wolf Lange** continues the A to Zee series using astronomical items beginning with the letter "E".

ECLIPSE chasers - remember we have a solar eclipse on 4<sup>th</sup> December. If you would like to be there, contact a committee member, or Brian Fraser, for further details on how to get to the areas of interest.

*The Editor*

*chris@penberthy.co.za*

<b>Committee of the Johannesburg Centre of the ASSA for 2001/2</b>		
Chairman	Trevor Gould	359 2089 - trevorg@transtel.co.za
Vice Chairman	Dave Gordon	702-1219 - dave@turboread.com
Secretary	Trevor Gould	359 2089 - trevorg@transtel.co.za
Treasurer	Dave Gordon	702-1219 - dave@turboread.com
Librarian	Evan Dembskey	340-4017 - evan@telemesssage.co.za
Curator of Instruments	Frans van Nieuwkerk	609-8158 - machteld@iafrica.com
P.R. and Media Liaison	Wolf Lange	849-6020 - wlange@mail.sbic.co.za
Assistant P.R.	Sharon Tait	447-7512- labelconnection@mweb.co.za
Viewing Officer.	Constant Volschenk	972-6038 - tabbie@icon.co.za
Council Rep.	Trevor Gould	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	Chris Stewart	763-3301 - cstewart@alcatel.altech.co.za
	Mary McKinnon	793-1937
Editor of CANOPUS	Chris Penberthy	793-7480 - chris@penberthy.co.za
Our Web Address is <a href="http://www.aqua.co.za/assa_jhb.htm">www.aqua.co.za/assa_jhb.htm</a> Send e-mail to <a href="mailto:assa_jhb@aqua.co.za">assa_jhb@aqua.co.za</a> and fax us at (011) 339-2926		

## Notice of Monthly Meeting

The Monthly Meeting of the Johannesburg Centre of the Astronomical Society will be held in the Sir Herbert Baker Library, 18a Gill Street, Observatory, on Wednesday the 10<sup>th</sup> of April, 2002 at 20:00.

## Basic Quantum Theory

By: **Rob Scott**

### Future Meetings

The following ideas/topics are currently being pursued:

A talk on SALT by one of the team members.

A visit and talk by Mark Shuttleworth - South Africa's first Astronaut ( Cosmonaut? ).

*If you have any ideas for topics or subjects that you feel should be presented at future meetings of the Johannesburg Centre, please contact one of the Committee members, or email us with the details thereof.*

*The Editor.*

### Telescope Making Classes

Would you like to make your own telescope?...or finish off a partially finished one? Well your opportunity has arrived (once again). Join the Telescope Making Class being held under the guidance of Brian, Evan and Chris. Contact Brian on (016) 366-0955 if you are interested.

### ASSA Jo'burg Telescope Making Class list server

A list server has been set up to facilitate communication between parties interested in the telescope making activities. By this means, a single message sent to the server will be forwarded to all subscribers to the list. Late-breaking news (e.g. the cancellation of the class for a given day) can be easily disseminated.

The list server also acts as a forum for discussion among those interested in the technicalities of telescope making, the sharing of telescope-related information, a means to offer suggestions or ask questions, offer links to interesting web sites, inform one's class mates of the availability of parts and materials, and so on. It will of course only be useful if people actually participate in this spirit, so it is up to you.

To subscribe to the mailing list, merely send an email to [assa\\_telescopemaking-request@list.to](mailto:assa_telescopemaking-request@list.to) with the word SUBSCRIBE in the body of the message. It will mail you back asking for confirmation - just follow the instructions.

To send mail to all subscribers to the list, merely send a single message to [assa\\_telescopemaking@list.to](mailto:assa_telescopemaking@list.to) and the list server will distribute the message to everyone concerned.

**Chris Stewart**

### 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.*

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A tiny thought for the day.

*If doctors spend 7 years getting their qualification, why is it that where they work is called a "Practice"?*

## ASSA Jo'burg Centre - Calendar of Events

Month	Day/ Date	Event	Details
Apr	Mon 8	Committee Meeting 17:30	
	Wed 10	<b>Monthly Meeting</b>	Basic Quantum Theory / Rob Scott
	Fri 12	<i>Public Viewing</i>	
	Sat 20	Broederstroom visit: Celebration of centenary of Franklin-Adams telescope	Visit will be with the Pretoria Center
May	Mon 6	Committee Meeting 17:30	
	Wed 8	<b>Monthly Meeting</b>	Fermi's First Reactor/ Mike Smith
	Sat 11	Autumn Star Party	Dave Gordon
	Fri 17	<i>Public Viewing</i>	
	Sat 18	Telescope Extravaganza - Military History Museum next to Johannesburg Zoo	Chris Stewart / Lerika Cross
Jun	Mon 10	Committee Meeting 17:30	
	Wed 12	<b>Monthly Meeting</b>	TBA - hopefully at discoverer of a recent supernova
	Fri 14	<i>Public Viewing</i>	FireWalking
Jul	Mon 8	Committee Meeting 17:30	
	Wed 10	<b>ASSA Jo'burg Centre A.G.M.</b>	
	Fri 12	<i>Public viewing</i>	
Aug	Fri 9	<i>Public Holiday</i> - probably no viewing	
	Mon 12	Committee Meeting 17:30	
	Wed 14	<b>Monthly Meeting</b>	TBA
Sep	Fri 6	<i>Public viewing</i>	
	Mon 9	Committee Meeting 17:30	
	Wed 11	<b>Monthly Meeting</b>	TBA
Oct	Mon 7	Committee Meeting 17:30	
	Wed 9	<b>Monthly Meeting</b>	TBA
	Fri 11	<i>Public viewing</i>	
Nov	Fri 8	<i>Public viewing</i>	
	Mon 11	Committee Meeting 17:30	
	Wed 13	<b>Monthly Meeting</b>	TBA
Dec	Tue 3	Star Party at Tshipese before	
	Wed 4	Solar Eclipse 2002	
	Mon 9	Committee meeting	
	Wed 11	<b>Year End Monthly Meeting</b>	Informal get together and viewing

### Reminders

2002	ASSA Symposium / hosted by Pretoria Centre/ At Aloe Ridge Hotel and Conference Centre LEONIDS Nov 19 <b>December 4, Solar Eclipse</b>
2003	Centenary of Flight <b>August: Mars opposition</b> <b>Mercury Transit</b>
2004	Centenary Sir Herbert Baker Library Building Johannesburg Centre to host 2004 ASSA Symposium <b>June 8, Venus Transit</b>

## The “A to Zee” of Astronomiee.

By: Wolf Lange

*A selective mixture of interesting terminology, objects, people of interest to all that love and are involved in Astronomy. Compiled by Wolf Lange who will deny any willful exclusions . . . . .*

*Sources include: Collins Dictionary of Astronomy 2<sup>nd</sup> Edition, Burnhams Celestial Handbook Revised and Enlarged Edition, Patterns in the Sky by Julian DW Staal and the Amateur Astronomers Handbook by JB Sedgwick.*

*Earth* – The third “rock” from the sun. Largest of the inner planets with an equatorial radius of 6378km, it has one natural satellite, the moon. The earth has an atmosphere consisting mainly of nitrogen and oxygen. 2/3rds of the earth are covered by water. Ocean depth ranges from 2500 to 6500 meters and the average land elevation is 860 meters. The three main layers are crust, mantle and core with the crust 30 – 40km thick under the continents, much thicker under the mountains and only about an average of 6km under the oceans. The mantle extends to depths of about 2900km and the core is composed mainly of iron with many other components. Temperature at the core level will be in the region of 4000 degrees Celsius. Even though 4,6billion years old the internal heat of the earth is still a powerhouse that produces earthquakes, volcanic eruptions and moving of continents about its surface.

*Earthshine* – (ashen light) this is sunlight reflecting from earth and making the dark side of the moon close to new moon become faintly visible – the old moon in the new moon’s arms!

*Eclipse* - the total or partial obscuration of light from a celestial body as it passes through the shadow of another body. The popularly known events of the solar (sun) eclipse and lunar (moon) eclipse occur when sun, moon and earth lie in or nearly in a straight line. Although the moon is 400 x smaller than the sun, it is also about 400 x nearer to the earth. The result is that sun and moon have almost exactly the same angular size of about ½ degree, which makes it possible for the moon to totally obscure the sun. For us to observe a solar eclipse the moon will have to pass directly in front of the sun. The shadow this event causes will move in a west to easterly direction in a very narrow curved strip across the earth. Maximum totality duration is 7mins 31secs (normally this tends to be in the region of 1 to 3mins).

*Ecliptic and ecliptic co-ordinate system* – the mean plane of the Earth’s orbit around the sun. It may thus be taken as coincidental with the sun’s apparent annual path across the sky. The planes of the ecliptic equator are inclined at an angle equal to the tilt of the earth’s axis. This angle is known as the obliquity of the ecliptic and it is roughly 23,5 degrees. The ecliptic co-ordinate system refers to the ecliptic as the fundamental reference circle - broadly the circle along which apparently the sun and the moon and all the planets move. The zero point is the vernal Equinox. The co-ordinates are the celestial (or ecliptic) latitude and longitude. The ecliptic system is the older but less used than the equatorial and horizontal co-ordinate systems.

*Elongation* – the angular distance between the sun and a planet i.e. the angle being sun-earth-planet, measured from 0 to 180 degrees east or west of the sun. It can also be the angular distance between a planet and one of its satellites. An elongation of 0 degrees is referred to as conjunction and one of 180 degrees is opposition.

*Emission Nebula* – there are generally three types of nebula: dark, emission and reflection. Emission is the result of a nebula being associated with a region of hot interstellar gas and dust that (because of the high temperature) shines by its own light. The emission nebulae again group into three classes H II (ionised hydrogen) e.g. Orion nebula, UV or ultraviolet ionised gas and O and B stars nearby radiating and causing the nebula to glow. The spectacular colours are predominantly green and red and result from recombination and excitation (red hydrogen alpha and oxygen providing the green colour).

*Encke's comet* - the most observed comet, having been seen at 55 apparitions. With a period of 3.3 years – one of the shortest – it is thought to be the parent body that gave birth to the Taurid Meteoroid Stream. The period of Encke decreases by up to 2.7 hours per orbital revolution. This is caused by a jet effect from its rotating nucleus, which is not thermally symmetrical. The brightness of Encke has hardly decreased during 165 years of observations. It will be a prime target for future spacecraft investigations, as its orbit is extremely accurately known.

*Ephemeris* – a work published annually in which the daily predicted positions of the sun, moon and planets etc are tabulated. Together with information about certain stars, eclipse etc it is used as a reference document for astronomical observations.

*Epoch* – an arbitrary fixed date or point of time that is used as a reference datum, especially for stellar co-ordinates and orbit elements. As the co-ordinates of right ascension and declination are constantly changing primarily as a result of precession of the equinoxes. Since 1984 the Julian year has been used, the current standard epoch, J2000.0 is 2000 Jan.1.5; it is exactly one Julian century removed from the standard epoch 1900 Jan 0.5. A standard epoch is usually retained for 50 years. (This means in layman's language is that any star charts you may have in books or as individually published sets marked 1950.0 are out of date and if marked epoch 2000.0 you are assured many more years of usage.

*Equatorial co-ordinate system* – the most widely used astronomical co-ordinate system in which the fundamental reference circle is the celestial

equator and the zero point is, strictly, the vernal equinox. The co-ordinates are right ascension and declination, which are measured along directions of terrestrial longitude and latitude. Sidereal hour angle is sometimes used instead of right ascension and south or north polar distance for declination. Presently the standard epoch in use is 2000.0.

*Equatorial mounting* – a telescope mounting in which one axis (the polar axis) is parallel to the earth's axis while the second one (declination) is at right angles to it. The net result is that your telescope moves around the one axis making it (in theory) simpler to keep an object in sight) in practise with standard Newtonian telescopes this is not always so easy to achieve accurately.

*Equinoxes* – the two points on the celestial sphere where the Ecliptic intersects the Celestial equator. Simply the two points where the sun annually crosses the equator in its apparent annual motion. These are referred to as the spring and autumn equinoxes depending on where you are (southern or northern hemisphere and they occur usually around 22/23 March and 22/23 September. The origin is Latin and it literally means Equal Night meaning day and night is of equal length. Currently the northern autumn equinox lies in the constellation of Virgo.

*Eridanus* – (river) a long straggling constellation in the Southern Hemisphere extending from Orion towards the southern pole region. Except for zero magnitude Achernar the brightest stars reach only 2 or 3 magnitude. Not spectacular at all it forms a long string with one fine double star Acamar (Theta). RA 1.5 to 6h, dec 0 to -58 degrees area 1138 sq. deg.

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## Astronomical Society of Southern Africa

You are cordially invited to attend a special function arranged to celebrate the centenary of the Franklin-Adams 10-inch telescope.

When : Saturday April 20<sup>th</sup> 2002

Where : Toppieshoek, Broederstroom (see below)

Time : From 3:00 pm onwards. Star gazing after dark.

Why : The Franklin-Adams telescope was built in England 1902 and taken to South Africa to photograph the southern sky. After being taken back to England it was returned to South Africa and installed at the old Union observatory in Johannesburg where it was used extensively. The closest star to our sun, Proxima Centauri was discovered on plates taken with this telescope. The year 2002 thus marks the centenary of this telescope.

Nature of Function

This function is being jointly hosted by the Johannesburg and Pretoria centres of the Astronomical Society of Southern Africa with the kind assistance of the Pretoria Technikon.

Apart from learning about the Franklin-Adams telescope, we will also be able to see the twin 16-inch Rockefeller telescope, which has a very nice 8-inch refractor finder-scope, which we may be able to use after dark to see the stars.

You will be able to braai at your leisure (please bring all food and drinks) .

At about 18:30 we will have a short talk, after which we will be able to do some star viewing. Please bring your telescope along.

Directions to Toppieshoek

“Toppieshoek” is the old Broederstroom observatory, overlooking the Haartebeestpoort dam. From Johannesburg take the R511 past Lanseria airport. At the T junction after crossing the Jukskei river bridge near Pelindaba, turn left. Travel 6.5 kms along this road and turn right, just past a new shopping centre and petrol station. Just before this road comes to a dead end , the entrance to Toppieshoek is on the right hand side. Go straight up this road to the observatory.

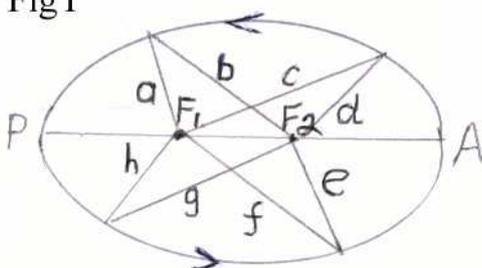
The turnoff to the observatory, at the shopping centre/petrol station, is signposted "Oberon"

Brian Fraser

HOW DID KEPLER DO IT (Part II)

Popular books on astronomy shy away from using mathematics because the publishers say every equation that appears in the book halves the number of readers. For example, they say that Copernicus stated that the planets revolve around the Sun in circles, but Johannes Kepler proved that the orbits of the planets are not circles but ellipses. *Full stop!* They don't even tell their readers what an ellipse is, the reader having only a vague idea that it is some sort of oval. Well, an ellipse is a very well- defined curve. Whereas a circle is the path of a point which moves so that its distance from a fixed point remains constant, this constant being the length of the radius of the circle; an ellipse is the path of a point which moves so that the sum of the distances from two fixed points remains constant, so that in Figure 1.

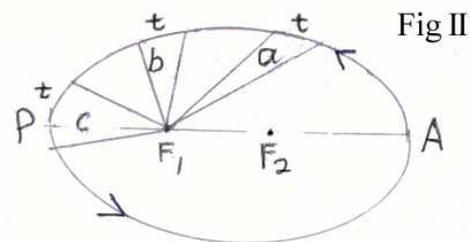
Fig I



$a+b = c+d = e+f = g+h$ . The two fixed points are the foci  $F_1$  and  $F_2$ . The Sun occupies one of the foci. The eccentricity of the ellipse is equal to  $F_1 F_2 \div AP$  where  $A$  and  $P$  are the extremities of the major axis of the ellipse. The further the foci are apart the GREATER IS THE ECCENTRICITY OF THE ELLIPSE. The ellipse also has the

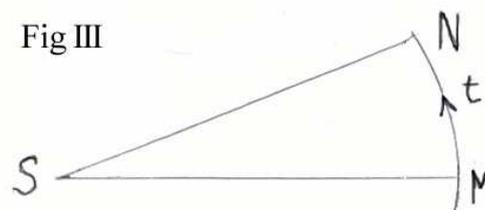
property that the radius vector sweeps out equal areas in equal times (Fig II.).

The areas of triangles  $a$ ,  $b$  and  $c$ , swept out in equal times  $t$ , are equal.



Now, how did Kepler work out the areas of triangles, having the Sun at the vertex and the base in the sky? He had the advantage of being able to use the very careful measurements that Tycho Brahe had made over a period of 20 years, especially of the positions of Mars.

Fig III



In Figure III  $M$  and  $N$  represent two positions of the planet separated by say, 24 hours, and  $S$  is the position of the Sun. The positions of  $M$  and  $N$  could be very accurately determined against the background of the stars. 24 hours are represented here by  $t$ . The area swept out by the radius vector

SM i.e. the straight line from the Sun to the planet, when it moves to the position N, is the area of the triangle SMN which can easily be calculated: Since the angle MSN is very small, being only seconds of arc, the angles SMN and SNM can be considered to be right angled = 90°. The area of a triangle is equal to ½ base times vertical height, This equals . Now multiply by 1 which is equal to  $\frac{MN}{MN}$ . So area of triangle SMN is equal to  $\frac{1}{2} SM \times MN \times \frac{MN}{MN} = \frac{1}{2} MN^2 \times \frac{SM}{MN}$   
 $= \frac{1}{2} MN^2 \div \frac{MN}{SM} = \frac{1}{2} MN^2 \div \sin MSN.$

This shows the power of mathematics, because the length SM was impossible to measure. Kepler could use thousands of positions of Mars for M and N and also the sizes of angle MSN. The problem was to calculate the sines of the very small angles, but Kepler was an outstanding mathematician and he knew how to do the calculations.

The important discovery that Kepler made, was that as Mars moved from aphelion to perihelion, the distances M-N grew steadily larger for equal lapses of time, but the areas of the triangles remained constant. The distances SM and SN had thus to be getting less and less, i.e. the planet

was steadily getting nearer and nearer to the Sun. This would not be the case if the planet's orbit was a circle.

Kepler found that the distance of Mars from the Sun varied from 1,38 AU to 1,66 AU, with a mean of 1,52, as we saw in the previous article.

The eccentricity of an ellipse is equal to:  $\frac{\text{Distance between the foci}}{\text{length of the major axis of the orbit}}$ . This is

$$\text{equal to } \frac{F_1 \cdot F_2}{AP} = \frac{1,66 - 1,38}{1,66 + 1,38} = \frac{0,28}{3,04} = 0,092.$$

He found that the eccentricity of Venus' orbit was very small, only 0,0068 while that of Mercury was very large, namely 0,206 and that of the Earth 0,017. Although the orbit of Venus is very nearly a circle, the distance between the foci of its orbit is no less than 1 470 975 km. In the case of Mercury the distance between the foci is 23 854 800 km. Mercury's distance from the Sun varies between 44 972 600 km and 70 827 400 km. These two distances are in the ratio of 1 to 1,575 so that the solar radiation that Mercury receives at perihelion is  $(1,575)^2 = 2,44$  times that it received at aphelion.

Jan Eben van Zyl

## Thank-you

I would like to thank Bruce, Eric and Brian for taking the trouble to answer my question on the speed of light. I was surprised and intrigued to see the different points of view you took when you answered what I thought was quite a straightforward question!! I, also, feel encouraged to ask some of my other questions I have (some inspired by the answers you gave to the previous one!), for which I thank you.

Best regards,

Val

## Questions & Answers

### *Karl's question*

From: kpospisek

[SMTP:kpospisek@telstra.com]

Sent: Tuesday, 05 March, 2002 3:27 AM

To: STEWART, Chris

Cc: kpospisek

Subject: Dangers with the big light in the sky.

Hi Chris,

I saw a program on TV last night about the sun. The Sun is a powerful light emitter. Online one can control telescopes to look into different parts of the sky. Is there anything that stops these telescopes from being pointed at the sun and burning out the CCDs ?

I can see simple rules for ground based telescopes (eg only allowed to operate from Sunset to Sundown ).

But what space-based telescopes that have no day/night. What if I want to focus on a planet

"close" to the Sun (eg mercury) - how would I prevent the telescope from passing across the sun's surface whilst it's moving to my object of interest ?

**Karl**

*Chris Stewart's Reply*

From: STEWART, Chris  
Sent: Tuesday, 05 March, 2002 9:24 AM  
To: 'kpospisek'  
Subject: RE: Dangers with the big light in the sky.

Hi Karl,

Of the telescopes that have a computer control system (many these days, my own Meade LX200 being one of them) most have built-in restrictions against pointing the telescope at or within a few degrees of the sun. However, the lesser control systems (again, like mine) only look at the destination co-ordinates when they start to slew, and apply that restriction. They do not DURING

the slew check whether they are nearing the sun. So, with my scope as an example, it is possible for it to slew right across the Sun en route to some other co-ordinate, but it is not possible to tell it to go to the sun's co-ordinates. (It is also clever enough to know whether the target object is above or below the horizon at the time, and doesn't bother going to targets below the horizon.) More modern control systems, and particularly those for space-based telescopes, have elaborate protection schemes built in deliberately. Many of the instruments are so sensitive, that there are many more things other than the sun which would destroy the instrumentation, that have to be taken into account. In the case of Hubble, the earth itself is one such target, and that is nearby - so large in the field of view. In fact, Hubble even has to shut down for a while as it enters or leaves the Earth's shadow, since thermal effects cause vibration.

Cheers,  
Chris

## Celebrations in Durban

Hi All

If any of your members are in Durban on 8th Mat they will be welcome to join us.

ASSA – Durban Centre 80th Anniversary Celebration

The Durban Centre was inaugurated on 8 May 1922, and we will be holding a celebration at the Pavillion at Marist Brothers College, South Ridge Road, Durban, at 6:30 p.m. for 7 p.m. on Wednesday 8 May 2002.

Wine, fruit juice, coffee, tea and light refreshments will be provided, but please bring any other requirements.

The function will be officially opened by our Chairman, Stuart Thomson, at 7 p.m. sharp, and thereafter there will be guided telescope viewing

(weather permitting), video films, slides and other displays of interest.

Please RSVP by 30 April to

**Roger Bond**  
Telephone 031-564-2502;  
136 Rinaldo Roads,  
Glenhills,  
4051;

E-mail - rogerandelspeth@eject.co.za

Yours sincerely,

**DENNIS SARGEANT**  
Secretary  
ASSA - Durban Centre

## A letter to the Jo'burgCentre

To: **STEWART, Chris**  
Subject: Franklin-Adams camera

From: **Jan Hers** <[janhers@pixie.co.za](mailto:janhers@pixie.co.za)>  
Subject: Franklin-Adams camera  
Date: 08 March 2002 04:51

Hello Chris,

It was nice to read something about the old Franklin-Adams camera and the forthcoming centenary.

But the first sentence might perhaps give a wrong impression. The instrument certainly did not spend all its life at " the southern station of the Leiden Observatory at Broederstroom". That would rather be putting the cart before the horse!

After it had been built (in 1902? I have no information about that)it was first used for mapping the northern sky and then sent down to the Cape to continue the work in the south. When in 1909 it was probably felt that the Transvaal would be a much better place than Cape Town, the instrument was donated to the new Transvaal Observatory, and for the first year or so the mapping of the southern sky was continued, after which it was wholly used by the Johannesburg Observatory. But I am sure you have all the details about that.

In later years, when it was realised that the work was increasingly hampered by the JHB city lights and smoke, thoughts went towards finding a new and better site, and when it was found that the Dept. of Education, Arts and Science owned a

farm near Hartbeespoort Dam this seemed to offer an ideal solution, thus overcoming the problem without having to buy a new site. The Franklin-Adams telescope was moved to the Hartbeespoort site in August 1954.

When the Leiden people, who for some years had been guests in the Observatory grounds in JHB, heard about this they asked whether they too might be permitted to make use of the Hartbeespoort site, and this was approved. So they moved their twin Rockefeller telescope to the new site as well. The new "Leiden Southern Station" was opened in August 1957.

However, the Leiden Observatory at no time owned the site, they were always guests on what was known as the Hartbeespoort Annexe of the Union (later: Republic) Observatory.

Originally it was planned to use the HBP site for installing our projected large reflecting telescope, but after having a good look at the region, I thought there was no future in that, we would never be away from the town lights. And what you write about it, proves that I was quite correct. It is sad to see all this residential development, but there is nothing one can do about it. And that was how we came to look at an altogether different part of the country. But that is another story!

Just one other matter: some common misprints in Canopus: Hartbeespoort, Hartbeeshoek --- ONE 'a' please. And Colesberg, NOT Colesburg, it is called after the mountain.

Kind regards,  
Jan.

## STUNNING NASA PICTURES ADDED TO 'AMESNEWS' WEB SITE

RELEASE 02-35AR

A stunning gallery of NASA pictures, with each image linked to news releases and other related items, recently was added to a NASA public affairs web site at:

<http://amesnews.arc.nasa.gov/imagearchive/archive.html>

Most images are provided in preview versions, as well as in higher resolution files. Almost all of the larger files are suitable for publication in newspapers and magazines. A help section describes various levels of quality, rights issues

and how to download images through the Internet to a user's computer.

"We redesigned how we present images to make the site more efficient to the news media, general public and students," said the image gallery's author, Anil Jindia, at NASA Ames Research Center, located in the heart of California's Silicon Valley. "These images can help readers to better comprehend our news items."

"The new image gallery is part of a comprehensive re-design of the Web site," said Jonas Diño, the site's curator. "The Web site has

been simplified to make sure people, including those with physical challenges, can easily access information."

General groups of images in the gallery include: 'Popular Images,' 'Aerospace,' 'Educational & Commercial Technology,' 'Information Technology,' 'Earth Sciences,' 'NASA/Ames/Moffett Field,' and 'Astrobiology.'

Astrobiology is the study of the origin, evolution, distribution and future of life in the universe.

More pictures and image subject groups will be added over time. In addition, the 'amesnews' site (at <http://amesnews.arc.nasa.gov/>) links to other NASA Ames scientific and technical Web pages, NASA Ames educational materials and the Ames employee newspaper, the 'Astrogram.'

## The Comet Hunter

By *Eric Talmadge*  
*The Associated Press*  
 March 21, 2002

MORI, Japan - The homemade telescope in Kaoru Ikeya's front yard isn't much to marvel at. It's painted flat black, has half a pair of binoculars for its makeshift finder, and looks its age of 25 years.

"I don't have a lot of money to put into my equipment," Ikeya said. "But it does the job."

Last month, Ikeya discovered his sixth comet, a cosmic wanderer making its first return to this part of the solar system in about 340 years. But in an age when most comets are found by professionals using multimillion dollar equipment, the days of discovery for amateur star buffs such as Ikeya may be numbered.

It's been more than 34 years since his last comet discovery, however.

If you have access to the Internet, you may browse the full story at this URL :

[http://www.journalstar.com/features?story\\_id=5301&past=](http://www.journalstar.com/features?story_id=5301&past=)

## Last Chance to See Comet Ikeya-Zhang

MEDIA RELATIONS OFFICE  
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 ADMINISTRATION  
 PASADENA, CALIF. 91109 TELEPHONE (818)  
 354-5011

<http://www.jpl.nasa.gov>

Night owls and early birds can catch a glimpse of Comet Ikeya-Zhang as it passes by Earth in the next few weeks on its four-century journey around the Sun.

The comet passed closest to the Sun on March 18th, and is now headed out of the solar system past Earth, passing closest to us (just 37.5 million miles, or 60 million kilometers) on April 29. To see the comet, look low in the western sky during late evening twilight. The comet will get lower and lower on the horizon until April 4; after that it will be visible in the early morning sky in the east.

"The comet is bright enough to see with the naked eye, but having binoculars or even a small telescope will help pinpoint its location," said Dr. Don Yeomans, head of NASA's Near-Earth Objects Program Office at the Jet Propulsion Laboratory, Pasadena, Calif.

Among the comet-watchers will be Dr. Michael Hicks, a comet scientist from JPL. Hicks will use a telescope to study the dust from Ikeya-Zhang, dust that comes from the very edges of the solar system and has a sharply slanted orbit, compared to the planets. The information he hopes to gather includes the dust particles' size, temperature and composition.

"Comet dust is some of the most pristine material from the solar system's formation," said Hicks.

"Studying comets adds another little bit to the puzzle of how the solar system came to be."

Comets, clumps of rock and ice, were made when the solar system formed 4.5 billion years ago from the same material that made the planets and Sun. When its orbit takes it far from the Sun, the low temperature of deep space keeps the comet frozen. As the comet comes close to the Sun, it heats up, emitting gases and the dust that reflects the Sun's rays and makes the comet visible from Earth.

Ikeya-Zhang, which was discovered in early February by a Japanese and a Chinese astronomer, was likely seen in 1661 on an earlier journey through the solar system.

## **Gravity in the Brain**

NASA Science News

March 18, 2002

Playing catch looks easy, but there's more to it than meets the eye. A ball-catching experiment in space has revealed that human brains have a built-in model of gravity.

If you have access to the Internet, point your browser for the full story :

[http://science.nasa.gov/headlines/y2002/18mar\\_p\\_layingcatch.htm?list40309](http://science.nasa.gov/headlines/y2002/18mar_p_layingcatch.htm?list40309)

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## **Sit. Speak. Good Photon!**

NASA Science News

March 27, 2002

Researchers have trapped a kilometers-long laser pulse inside a small glass chamber --and released it again intact. Such extraordinary command of light could lead to mind-boggling new technologies.

If you have access to the Internet, you can get the full story here :

[http://science.nasa.gov/headlines/y2002/27mar\\_s\\_toplight.htm?list40309](http://science.nasa.gov/headlines/y2002/27mar_s_toplight.htm?list40309)

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## **AN EARLY NASA PIONEER STILL ON THE JOB IN DEEP SPACE**

RELEASE: 02-24

It took a little extra effort, but NASA this weekend bridged a nearly seven-and-a-half billion mile span to make contact with Pioneer 10, a plucky space probe that first left Earth's gravitational pull more than 30 years ago.

On Friday, scientists at the NASA Jet Propulsion Laboratory's (JPL) Deep Space Network in Goldstone, Calif., sent a signal to the spacecraft, which is still hurtling toward the fringes of the solar system. Twenty-two hours later, at 1:47 p.m. PST, researchers at the network's facility in Madrid, Spain, carefully monitoring a 70-meter dish antenna, heard Pioneer's response.

"We are overjoyed that we still have the spacecraft," said Robert Hogan, chief of NASA Ames Research Center's Space Projects Division, where the Pioneer Project is managed.

"As an eternal optimist, I was confident it would succeed. Pioneer 10 has been discounted in the past, but somehow it always manages to land on its feet," recalled Pioneer 10 Project Manager Dr. Larry Lasher of Ames, located in California's Silicon Valley. "This success is a testament to good solid design."

"From Ames Research Center and the Pioneer Project, we send our thanks to the many people at the Deep Space Network and JPL who made it possible to hear the spacecraft signal again," said Pioneer 10 Flight Director David Lozier.

NASA previously lost contact with Pioneer 10 in August 2000, but made contact again in April of last year by switching the spacecraft to a different communications mode. NASA most recently made contact with

the spacecraft on July 9, 2001.

Launched on March 2, 1972, Pioneer 10, built by TRW Inc., Redondo Beach, Calif., is now 7.4 billion miles from Earth. Pioneer 10 was the first spacecraft to pass through the asteroid belt and the first to make direct observations and obtain close-up images of Jupiter. During its tour of the jovian system, Pioneer 10 also charted Jupiter's intense radiation belts, located the planet's magnetic field, and established that Jupiter is predominantly a liquid planet.

In 1983, it became the first man-made object to leave the solar system when it passed the orbit of Pluto, the most distant planet from the sun.

The spacecraft continued to make valuable scientific investigations in the outer regions of the solar system until its science mission ended on March 31, 1997. Pioneer 10's weak signal continues to be tracked by the Deep Space Network as part of an advanced concept study of communications technology. The probe was also used to help train flight controllers how to acquire radio signals from space.

Pioneer 10 is headed toward the constellation Taurus, where it will pass the nearest star in the constellation in about two million years.

"Pioneer 10 has performed much better than expected," added Hogan, who is also a member

of the original launch team for the spacecraft. "It's amazing that it's lasted this long."

Scientific data received from Pioneer 10's Geiger-Tube Telescope instrument are analyzed by original principal investigator Dr. James Van Allen of the University of Iowa, who discovered the Earth's radiation belts bearing his name. Based on the previous data received, Van Allen concluded that galactic cosmic radiation is being

moderated by the sun's influence, meaning Pioneer 10 has not yet crossed the boundary into interstellar space.

Further information about Pioneer 10 is available on the Internet at:

[http://spaceprojects.arc.nasa.gov/Space\\_Projects/pioneer/PNhome.html](http://spaceprojects.arc.nasa.gov/Space_Projects/pioneer/PNhome.html)

## Library Report

Firstly, an apology. I am busy cleaning, sorting, ordering and cataloguing the library and this, as you can imagine, makes it difficult to find specific books. Please bear with me until I get it into tip-top shape. Pursuant to this, if you have had any books out for longer than three months, please return them so that they can be cataloged. Generally, books are available to loan for a month, or longer by arrangement with the librarian.

Secondly, if you have any topical books that you no longer need or want, please think of donating them to the library or at least make someone on the committee aware that they are for sale.

I have set aside a shelf especially for beginners' books. If you are new to astronomy, this is the shelf for you. Here you'll find all you need to set you on the path to expert-dom!

Clear skies.

**Evan Dembskey**

## Web Between the Worlds

I am always trolling about the 'net for titbits of interesting information. Trouble is, a number of the more popular search engines now sell priority to the highest bidder. Give them money, and their site will always feature prominently in a search.

Two that don't can be found at

<http://www.google.com> and

<http://www.scirus.com/>.

With the Rand reaching new all-time lows regularly, 'scopes are reaching new all-time highs. Why not join our ATM class and build

your own? Here are some sites to show you what can be done.

Dave Aucoin offers his thoughts on building a lightweight and portable dobsonian.

<http://www.geocities.com/Deepskydave/Dobscope.html>

As does Steve Scampini:

<http://www.atmob.org/Articles/BuildingADob.html>

And finally Kevin McCarthy offers short reviews on a number of commonly available raytrace programs.

<http://www.atmob.org/Articles/RaytraceProgramsforATMs.html>

JPL's solar system dynamics WWW site provides information related to all known bodies in orbit around the sun. This site is maintained by the Solar System Dynamics Group of the Jet Propulsion Laboratory.

<http://ssd.jpl.nasa.gov/>

Moon Base Clavius is an organization of amateurs and professionals devoted to the Apollo program and its manned exploration of the moon. Our special mission is to debunk the so-called conspiracy theories that state such a landing may never have occurred. This site is named after the Clavius Moon Base in Arthur C. Clarke's novel 2001: A Space Odyssey, and visualized by Stanley Kubrick in the film of the same name.

<http://www.clavius.org/index.html>

Clear skies!

**Evan Dembskey**

## NASA's New Asteroid Sentry Stands Watch

By Robert Roy Britt

14 March 2002

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NASA announced this week a new Web-based asteroid monitoring system, called Sentry, to monitor and assess the threat of space rocks that could possibly strike the Earth.

The setup is designed to help scientists better communicate with each other about the discoveries of new, potentially threatening asteroids and the follow-up observations that typically show those asteroids to be, in fact, no threat.

The Sentry system

The new Sentry system, developed over the past two years, is partly a response to this perceived need. It is operated out of NASA's Jet Propulsion Laboratory. The system's online "Risks Page" included 37 asteroids as of Thursday morning.

"Objects normally appear on the Risks Page because their orbits can bring them close to the

Earth's orbit and the limited number of available observations do not yet allow their trajectories to be well-enough defined," said JPL's Donald Yeomans, manager of NASA's Near-Earth Object Program Office, which oversees Sentry.

"By far the most likely outcome is that the object will eventually be removed as new observations become available, the object's orbit is improved, and its future motion is more tightly constrained," Yeomans said in a statement.

He added that several asteroids will be added to the list each month, only to be removed to another "no-risk" page soon afterward.

For more information, point your Internet browser here:

[http://www.space.com/scienceastronomy/solarsystem/asteroid\\_sentry\\_020314.html](http://www.space.com/scienceastronomy/solarsystem/asteroid_sentry_020314.html)

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## ScopeX - 2002

Hello there,

The ASSA Johannesburg Centre is organising a Telescope and Astronomy Exhibition on 18 May. We plan to hold the event at the War Museum in Saxonwold, next to the Johannesburg Zoo, though this venue is yet to be confirmed. The exhibition will include self-made and commercial telescopes. We also plan to have some interesting special exhibitions and a "swap shop", as well as multimedia presentations in the auditorium. While geared mostly toward the enthusiast, the event will be open to the public.

We plan to start the exhibition at about 12h00 and then continue into a star party in the evening. All in all, it should be a pleasant day where the amateur astronomers and sky gazers of Gauteng can come and share their experiences, knowledge and interests.

As you have attended a telescope making class sometime in the past, you are invited to come and exhibit your scope(s) and accessories. Even if you have not completed your mirror making, you

are most welcome to come and enjoy the afternoon with us and maybe get some inspiration to tackle this special hobby afresh. In fact, this may be just what you need to pick up some of those projects you have been intending to get around to. It's also an opportunity to dispose of or acquire telescope & astronomy-related "junk".

Please let us know if you want to be an exhibitor in order for us to plan the exhibition space. ( If you would like to assist in organising the event, so much the better! ). You can respond to the ScopeX committee by e-mail via [mailto:scopex\\_comm@list.to](mailto:scopex_comm@list.to). In any event, please diarise the day. We will in due course be in touch again with further information about the day, and will also post news of this event on the ASSA Jhb Centre's website at [http://www.aqua.co.za/assa\\_jhb.htm](http://www.aqua.co.za/assa_jhb.htm)

For those of you who would like to discuss this among yourselves, a forum is available; to join the discussion list, simply send [mailto:scopex\\_forum-request@list.to](mailto:scopex_forum-request@list.to) with the word SUBSCRIBE in the body of the email. To

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send mail to the forum ( for automatic distribution to every subscriber ), merely [mailto:scopex\\_forum@list.to](mailto:scopex_forum@list.to)

Please also advertise the event among your friends. Feel free to pass on this mail.

The society still has their regular meetings on the second Wednesday of each month at the Observatory - you are very welcome to join us

for some interesting discussions. The telescope making class is also still going strong, meeting in the Technology centre of Parktown Boys' High School from about 14h30 on Saturdays. Why not stop in and visit?

Regards,  
**Chris Stewart**

## ASSA SYMPOSIUM 2002

The Fifth ASSA Symposium will be held from Friday November 29 to Sunday December 1 at the Aloe Ridge Hotel and Observatory, and is being organised by the Pretoria Centre of ASSA.

The Symposium will bring together professional and amateur astronomers to present and listen to papers on a wide range of topics. There will be papers on latest research, instrumentation, amateur observing, history, and an entire session devoted to the total eclipse of the sun which takes place on the morning of December 4 from northern South Africa, the first total eclipse of the sun visible from South Africa since 1940.

We are privileged to confirm Dr Janet Mattei will attend from the AAVSO.

Persons interested in presenting a paper at the Symposium, or attending the Symposium can contact the Chairman of the Organising Committee, Tim Cooper, at [tpcoope@mweb.co.za](mailto:tpcoope@mweb.co.za), or on 011-967-2250.

Registration forms will be sent out shortly and will also be available electronically.

**Tim Cooper**

### For Sale

#### **Telescope**

refractor 76mm lens  
900mm focal length on equatorial mount  
with sidereal motion electric motor  
+ many accessories all in wooden carry box.  
As new condition.

R1500.00 or nearest cash offer

#### **Contact Robert**

(011) 682 3398 all hours or  
011 432 1250 after 30 March 2002

### **Asteroid Buzzes Earth From 'Blind Spot'**

New Scientist  
March 15, 2002

One of the largest asteroids known to have approached the Earth zipped past about 450,000 kilometres away on March 8 - but nobody recorded it until four days later.

The object, now called 2002 EM7, was hard to spot because it was moving outward from the innermost point of its orbit, 87 million km from the Sun. When it passed closest to the Earth - just 1.5 times the distance to the Moon - it was too close to the Sun to be visible.

Asteroids approaching from this blind spot cannot be seen by astronomers. If a previously unknown object passed through this zone on a collision course with Earth, it would not be identified until it was too late for any intervention.

For more detailed information, you can point your Internet browser here :

<http://www.newscientist.com/news/news.jsp?id=ns99992052>

You can find tones of interesting information by browsing the New Scientist website at :

<http://www.newscientist.com/>

# The Sky this Month

## April 2002

dd hh	dd hh
4 15 <b>LAST QUARTER</b>	15 23 Mars 2.4 N of Moon
6 16 Neptune 4.0 N of Moon	16 20 Saturn 0.8 S of Moon...Occn.
7 08 Mercury in superior conjn.	17 23 Mercury greatest brilliancy
8 01 Uranus 4.2 N of Moon	18 22 Jupiter 1.6 S of Moon
10 04 Moon at apogee	20 12 <b>FIRST QUARTER</b>
12 19 <b>NEW MOON</b>	25 14 Moon at perigee
13 06 Mercury 4.4 N of Moon	27 03 <b>FULL MOON</b>
14 17 Venus 3.1 N of Moon	29 13 Mars 6.4 N of Aldebaran

## May 2002

dd hh	dd hh
3 23 Neptune 4.3 N of Moon	13 20 Mercury 2.7 N of Moon
4 02 Mercury greatest elong. E(19)	14 07 Saturn 0.9 S of Moon...Occn.
4 07 <b>LAST QUARTER</b>	14 18 Mars 0.9 N of Moon...Occn.
4 14 Venus 6.5 N of Aldebaran	14 22 Venus 0.0 N of Moon...Occn.
4 17 Mars 2.3 N of Saturn	16 07 Mercury stationary
5 09 Uranus 4.3 N of Moon	16 12 Jupiter 1.9 S of Moon
7 18 Venus 2.5 N of Saturn	19 19 <b>FIRST QUARTER</b>
7 20 Moon at apogee	23 15 Moon at perigee
10 21 Venus 0.3 N of Mars	26 12 <b>FULL MOON</b> <i>Eclipse</i>
12 11 <b>NEW MOON</b>	27 07 Mercury in inferior conjn.
13 11 Neptune stationary	31 08 Neptune 4.3 N of Moon

### LOCAL TIMES of RISE and SET for the MAJOR PLANETS, 2002

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
Apr 01	06.18	18.06	05.49	17.53	07.41	19.03	09.21	20.11	12.48	23.16	10.47	21.28
Apr 11	06.23	17.56	06.40	18.09	07.58	19.02	09.14	19.55	12.13	22.41	10.12	20.52
Apr 21	06.27	17.46	07.35	18.28	08.16	19.03	09.06	19.41	11.39	22.08	09.37	20.17
May 01	06.32	17.38	08.10	18.41	08.33	19.07	08.58	19.28	11.06	21.35	09.03	19.42
May 11	06.38	17.31	08.09	18.34	08.51	19.15	08.50	19.16	10.33	21.03	08.29	19.07
May 21	06.43	17.26	07.25	18.01	09.06	19.27	08.40	19.04	10.01	20.32	07.55	18.32
May 31	06.48	17.23	06.18	17.10	09.18	19.41	08.30	18.54	09.30	20.01	07.21	17.58