

CANOPUS

The Astronomical Society of Southern Africa

Johannesburg Centre

Monthly Newsletter for February 2004

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

Editorial

Welcome to the first issue of 2004 – the year is off to a good start, what with the twin rovers successfully landing on Mars and some teething problems notwithstanding, seeming to be set for some good science. The first rover - Spirit - seems to be recovering from it's problems, and the second - Opportunity - is at this early stage, still viewing Mars from the comfort of its lander. The ESA's Beagle 2 lander seems to have fallen prey to some sort of accident, but efforts continue to try to establish communications with it.

Saturn is looking really good in the late evenings with rings well presented and **Venus** is especially bright in the early evening. On the 24th January, it presented a beautiful picture together with the fairly new Moon. Orion and its attendants, as well as Taurus, are quite magnificent when the clouds are not forming a barrier between Earth and the skies. In the early mornings **Jupiter** reigns supreme and looks big, bright, bold and brilliant with tonnes of detail in a moderate to large 'scope. The Southern Cross and pointers are also nice and high in the South at the same time - try to find the Jewel Box -.

Our **Chairman Dave Gordon** submits his first Chat from the Americas and **Eben van Zyl** has submitted a piece on the Spaceguard Survey which will be of interest to all of us. Several articles relating to the flurry of Mars activities have been gleaned from the ESA and NASA web sites to keep you all in touch with the happenings on the Fourth rock from the Sun. **Brian Fraser** has, as always, supplied us with the items of astro-interest over the next 2 months as well as a short insight as to the origins of words and **Trevor Gould** has submitted a set of Astronomical Questions and Answers which could really tickle your funny-bone.

Members - how about letting us (the committee that is) know what you'd like to have presented at the monthly meetings, or the kind of articles that you would like to see appearing in Canopus. These requirements should be of an Astronomical bent or at least something of a scientifically related nature. If it is in our power to do so - we will try to meet your request(s).

The Editor

chris@penberthy.co.za

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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, 11th of February, 2004 at 20:00.

Land of the Midnight Sun

By: Gil Jacobs

Beginners Class

The topics that Jerome will tackle at the next Beginners' Class (prior to the main ASSA meeting) are:

- * Starcharts revisited
- * Time in astronomy

Telescope Making Classes

Would you like to make your own telescope?...or finish off a partially completed one? Well here's your opportunity. Join the Telescope Making Class being held under the guidance of Brian, Vince and Chris.

Contact Chris on (011) 763-3301 or email cstewart@alcatel.altech.co.za if you are interested.

ASSA Lists

ASSA Jo'burg Centre:- To subscribe to the new ASSA announces list, send a blank mail to:
assajhb_subscribe@yahoogroups.com.

You will receive instructions by return mail. ASSA Jo'burg centre members are strongly advised to subscribe to this list to receive late-breaking announcements (e.g. venue changes for meetings).

Amateur Telescope Making:- news and discussion on the subject of telescope making, a means for people involved or interested in our telescope making class to share their experience.

assaatm_subscribe@yahoogroups.com

Imaging:- News and discussion on the subject of astro imaging (film and electronic); a means for people involved in or interested in our imaging group to share their experiences and techniques.

assaimaging_subscribe@yahoogroups.com

and finally, a periodic digest of general news relating to astronomy and space exploration

Zastro_subscribe@yahoogroups.com

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 717-1397 or email- tabbie@icon.co.za to ensure that viewing IS taking place on the specified evening.

ASSA Jo'burg Centre - Calendar of Events

Month	Day/ Date	Event	Details
Feb	Mon 9	<i>Committee Meeting</i>	
	Wed 11	Monthly Meeting	Land of the Midnight Sun Gil Jacobs
	Fri 20	<i>Public Viewing</i>	
Mar	Mon 8	<i>Committee Meeting</i>	
	Wed 10	Monthly Meeting	Galaxy Classification in the 21st Century: The Hubble Tuning Fork Strikes a New Note. Robert Groess
	Fri 19	<i>Public Viewing</i>	
Apr	Mon 12	<i>Committee Meeting</i>	Maybe (<i>this is Easter Monday</i>)
	Wed 14	Monthly Meeting	Impact Craters Dr. Smart
	Fri 16	<i>Public Viewing</i>	
May	Mon 10	<i>Committee Meeting</i>	
	Wed 12	Monthly Meeting (<i>at the Planetarium</i>)	Pre-Venus Transit Meeting
	Fri 14	<i>Public Viewing</i>	
Jun	Mon 7	<i>Committee Meeting</i>	
	Wed 9	Monthly Meeting	T.B.A.
	Fri 11	<i>Public Viewing</i>	
Jul	Mon 12	<i>Committee Meeting</i>	
	Wed 14	Annual General Meeting	T.B.A.
		<i>Public Viewing</i>	

Reminders

2004	March - 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

Welcome to new Members

Barend Botha **Gideon Schachat** **Attie Nel**
Johan van der Walt **Andre van Rooyen**

We wish you clear skies and many happy years of observing

SPACEGUARD SURVEY

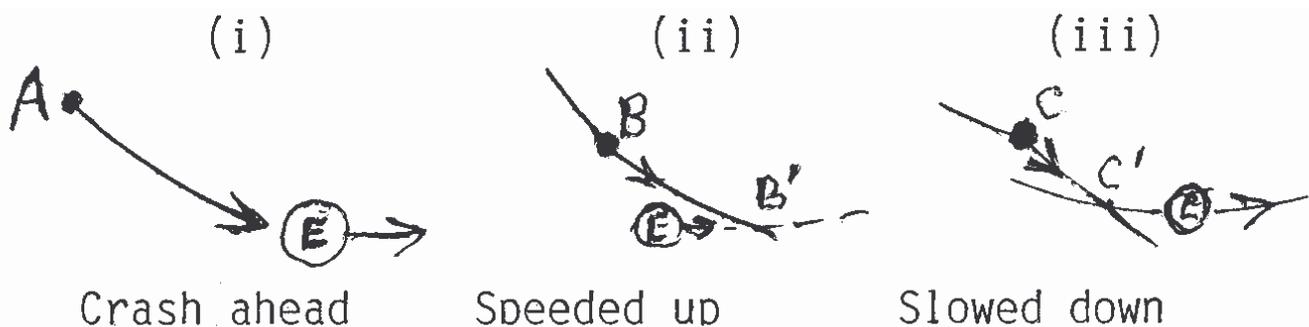
In the article on The Minor Planets (November) it was stated that the minor planet Hermes which had been lost since 1937, had probably crashed into the Sun. In the same Canopus Brian Fraser wrote that Brian A. Skiff of Lowell Observatory had rediscovered Hermes. It had also been found by Jean-Luc Margot of the University of California that Hermes consists of two almost equal pieces, each about 2 km in size - a rather rare occurrence.

There must be many thousands of bodies smaller than one kilometre which cross the Earth's orbit or come close to the Earth. The smallest bodies of only a few centimetres in size vaporise when they enter the Earth's atmosphere and leave glowing trails. These are called bolides. Larger bodies, of size up to about 60 metres explode when they come down to heights of about six kilometres. The body which exploded over Tunguska in Siberia on 6 June 1908 came down to a height of about 8½ kilometres above the surface. Its explosion liberated a force equal to 10 megatons of TNT, flattening trees up to a distance of 30 km. This body was probably the nucleus of a comet because no metallic remnants have been found there.

Bodies larger than 1 kilometre would penetrate right through the atmosphere and strike the Earth's surface with a force equal to that liberated by 100 000 megatons of TNT. It appears that every 5 000 years at least one body of that size is slated to strike the Earth. If the point of impact happens to house a city the damage and loss of life would be appalling. Has the time not now arrived that man should take the necessary steps to obviate such a catastrophe? It certainly has and the technology also exists to carry out the

necessary measures of prevention. This can be accomplished by launching a rocket to go and push the near-earth-object (n.e.o.) into an orbit which will miss the Earth. The sooner this can be tried out on a "sample body" the better.

The vast majority of minor planets revolve in orbits which are direct (counter-clockwise as seen from the north) so they revolve around the Sun in orbits which run more or less parallel to the Earth's orbit. In such cases sufficient time will be available to carry out the rescue mission. However, there are a few cases of orbits which are retrograde, so that these bodies move in retrograde orbits in a direction opposite to the Earth's direction of motion. Jupiter could deflect a minor planet, moving direct, into a retrograde orbit. So this danger really exists. In these cases there will not be sufficient time to go and push the body away into a safe orbit. In desperation, man will have to launch a rocket to such a body, carrying a nuclear bomb which will be made to explode when it comes into contact with the rogue asteroid. The asteroid will be broken up by the explosion into many thousands of pieces of varying sizes, thus minimising the threat of a single crash, but vastly increasing the area of somewhat lesser damage. But blowing the n.e.o. to smithereens could be a last resort. Let us deal with the easiest case, that of a directly orbiting asteroid. In Diag. (i) the asteroid A is shown, headed for a crash with the Earth. In Diag. (ii) the body B has been pushed forward in its orbit so that it will pass the Earth and cross Earth's orbit ahead of the Earth at B'. In Diag (iii) the n.e.o. has been slowed down so that it will pass behind the Earth and cross the Earth's orbit at C'.



The rocket which is to be launched will go and attach itself to the minor planet and then continuously fire out very high velocity ions. Newton's third law states that to every action there is an opposite but equal reaction. In this way the body can gradually be moved.

NASA has already started work on what is known as the Prometheus project in which NASA is designing a nuclear reactor that could provide the power to blast high-speed ions to propel a spacecraft to Jupiter's moons, Callisto, Ganymede and Europe. (In 10 years' time!).

At its orbital speed of 29,785 km per sec, the Earth takes 430 seconds to move a distance equal to its diameter (12 756 km). So if the n.e.o. can be speeded up or slowed down by 430 seconds it will miss the Earth by one Earth-diameter. This means that the n.e.o. will have its speed changed by 2 cm per sec. A rocky n.e.o. of diameter 1 kilometre will have a mass of about 50 million tons, so to bring about a very small change of speed, will require pushing it for several years. If it ever becomes possible to guide a minor planet so that it describes an orbit around the Earth, it will be possible for man to mine the minerals on the minor planet.

During March 2002 astronomers observed a 70 metre long rock 461 000 km from the Earth four days after

its closest approach to Earth. Since then an international effort has come on stream to track down such objects. It is called the Spaceguard Survey. This is just the beginning. The scope of the survey will have to be continually increased. Amateur astronomers are welcome to join in the survey. Since 1998 NASA has pursued the goal of detecting at least 90% of the suspected 1 100 n.e.o.'s larger than 1 km in size. After 5 years of searching 660 such objects have been tracked as well as 1 800 smaller bodies. 99% of the bodies so far spotted do not pose a threat to the Earth for the next 100 years. It must be borne in mind that objects as small as 200 metres could destroy a city. Spaceguard Survey needs all the assistance it can get.

Jan Eben van
Zyl

Chairman's Chat

As I stood at the apex of the Pyramid of the Moon and gazed transfixed down the Avenue of the Dead, I tried to imagine what the scene may have been around 300 BC, when this was a bustling city of perhaps 250 000 people. For this is Teotihuacan, or "Place of the Gods", the original builders of which remain a mystery. The numerous altars below me, in the Plaza of the Moon, are definite indicators to the sacrificial ceremonies (possible human) that were being practiced at Teotihuacan long before the arrival of the Aztecs to the valley of Mexico.

The moment I arrived at this mysterious monument, a mere 40-minute bus ride out of Mexico City centre, I was impressed by the vastness of the complex: 6km by 3km. Many mounds and hillocks in the vicinity, known to contain smaller pyramids and altars, are yet to be excavated. Our Mexican guide explained to the small party that there had been thousands of skeletons excavated from the Avenue of the

Dead, adding, with a nervous chuckle, that there was now nothing to be concerned about.

To the west of the Pyramid of the Moon (which was an exhausting 48 meter climb for an unfit me) is the Palace of Quetzalpapalotl (go ahead, work on that pronunciation!). This is the Palace of the Precious Butterfly, where priests serving the sanctuary of the Moon lived. The highly decorated carved pillars of great feathered creatures, jaguars, shells and flowers.

After a 1km walk southwards, it was time to attempt the climb to the apex of the great Pyramid of the Sun (64m high, 213 square metres at the base, and covering almost the same space as the great Pyramid of Cheops in Egypt. The sides are terraced and wide steps lead to the summit. Incidentally, the original 4m covering of stone and stucco was removed by mistake in 1910. After an agonising climb, and with calves and knees burning in protest, the summit at last. And worth every painful step! The view from the

top gives a wonderful perspective of the entire Teotihuacan complex and an idea of the enormity of the ancient civil engineering feat. The view of the rest of Mexico City, the largest city in the world and home to 22 million people, was stupendous.

Excavations into the Pyramid of the Sun have shown there to be no fewer than 6 separate pyramids constructed beneath the existing visible structure. The Aztecs are thought to have built a new pyramid structure, above the previous one, every 52 years.

Finally, 3km from the Pyramid of the Moon and at the southern-most end of the Avenue of the Dead, lies the Temple of Quetzalcoatl (the plumed serpent, lord of air and wind). During my walk

through the complex, my thoughts kept drifting to the astronomical significance of the structures to the original builders. Unfortunately, our guide was not keyed into the astronomically-related significance of Teotihuacan, but he could tell me that at the stroke of noon on the March Equinox, the sun is perfectly aligned to the west face of the Pyramid of the Sun and not a single shadow is cast by the pyramid. I really needed to ask him the effects of precession of the equinoxes with respect to the original structural alignments, and any connection to other astronomical objects, but I think I will need to research that one for myself.

Dave Gordon

Typed at an Internet cafe in Puerto Escondido, a sleepy fishing village in Southern Mexico.

Some additional communications from Dave

From: David Gordon
[mailto:dave5@corpdial.co.za]
Sent: Wednesday, January 21, 2004 9:39 PM
Subject: Hi From Puerto Escondido

Hi All

Arrived yesterday after 12 hour overnight bus journey (jam packed) in Puerto Escondido from Zihuatenejo - which is a beautiful and quaint little Mexican fishing town. Found a coffee shop on the beachfront of Zihuatenejo that serves the most amazing blend of dark strong coffee.

Very tempted to go scuba diving but at US\$80 I'll blow my budget before I get to Machu Pichu and Inca Ruins.

Puerto Escondido is surfers paradise and I'm staying at a hippy hotel called Rockaways. Full of ZZ top looking people (long beards and long hair, all in their 50s and 60s) and flower-power types. I thought this hippy-thing died in the sixties. A Californian, taking a break from his construction business, tagged along with me from Zihuatenejo. A rather strange, very loud fellow, who drinks far too much beer, belches a lot and curses plenty. He carries a small furry hippo in his backpack for good luck - figure that one out!

This evening, I catch a bus to Tapachula on the Mexico/Guatemala border (15 hour bus journey). I keep asking why the heck I'm putting myself through this but the thought of seeing the live volcanoes of Antigua keep me going.

A bit concerned about travelling in Guatemala but I'll try and run through as safely as I can.

I'll stay in touch and send another update soon.

Dave

From: David Gordon
[mailto:dave5@corpdial.co.za]
Sent: Saturday, January 24, 2004 4:55 AM
Subject: Hi from Antigua, Guatemala

Hi All

I successfully negotiated the border between Guatemala and Mexico after a 13 hour bus ride from Puerto Escondido to the border town of Tapachula (Mexico). The change in scenery, people, architecture was immediate. More poverty, informal business, touts, money changers and chancers. Caught a taxi, then a mad dash for a bus, where my back pack was simply thrown onto the roof of the bus and I was shuffled into the bus as it was accelerating away. The destination was completely unknown to me. I met 4 other backpackers on the bus (Swede, German, Dutchman and Swiss) and we decided to hang together and see how the destination panned out.

After a 3 hour race through the Guatemalan countryside (overtaking on blind rises is a new phobia for me), arrived at a town called Quetzaltenango. Very picturesque, baroque

architecture, narrow streets, each building coloured differently, and the Volcano Maria as an amazing backdrop to the city. Found a little hostel for \$3 per night. The Guatemalans appear quieter, more reserved than the Mexicans. They are very quiet on the buses.

This morning, found my way to the bus stop and again, with backpack thrown onto roof-rack and me doing a mid air flying leap to jump onto the moving bus. I needed to change buses at a town I couldn't remember the name of nor pronounce when I could. Something like Chimaltenango. The locals somehow just shepherded me onto the right bus bound for Antigua. Another 45 minutes later, and another picturesque town, this time surrounded by 3 volcanoes, Vocan Fuego is live and belching ash. Wouldn't mind seeing if I can find a guide to take me to the top of that one.

I'm not sure what me next move will be but thinking of going to Flores, which is the town nearest Tikal in Northern Guatemala, a huge

complex of Mayan pyramids and ruins. On the down side, my lack of Spanish is really getting me down. My inability to converse with the locals in any way other than the very basic is extremely isolating. More frustrating on my part than I ever imagined. My current feeling is that I need to build a fluency in Spanish before attempting South America proper because I definitely am missing a part of the culture in being non comunicado.

I'll stay in touch
Bye for now
Dave

p.s. Please extend a little license on the spelling and punctuation. No spell check and I'm still trying to figure out the Spanish keyboard.

(That's OK Dave - I've got a spell checker - ed.)

CHANDRA LOCATES MOTHER LODE OF PLANETARY ORE IN COLLIDING GALAXIES

NASANews@hq.nasa.gov

RELEASE: 04-013

NASA's Chandra X-ray Observatory has discovered rich deposits of neon, magnesium and silicon in a pair of colliding galaxies known as The Antennae. When the clouds containing these elements cool, an exceptionally high number of stars with planets should form. These results may foreshadow the fate of our Milky Way and its future collision with the Andromeda Galaxy.

"The amount of enrichment of elements in The Antennae is phenomenal," said Giuseppina Fabbiano of the Harvard-Smithsonian Center for Astrophysics (CfA) in Cambridge, Mass. at a press conference at a meeting of the American Astronomical Society in Atlanta. "This must be due to a very high rate of supernova explosions in these colliding galaxies." Fabbiano is lead author of a paper on this discovery by a team of U.S. and U.K. scientists that will appear in an upcoming issue of The Astrophysical Journal Letters.

When galaxies collide, direct hits between stars are extremely rare, but collisions between huge gas clouds in the galaxies can trigger a stellar baby boom. The most massive of these stars race

through their evolution in a few million years and explode as supernovas. Heavy elements manufactured inside these stars are blown away by the explosions and enrich the surrounding gas for thousands of light-years.

The amount of heavy elements supports earlier studies that indicate there was a very high rate of relatively recent supernovas, 30 times that of the Milky Way," according to collaborator Andreas Zezas of the CfA.

The supernova violence also heats the gas to millions of degrees Celsius. This makes much of the matter in the clouds invisible to optical telescopes, but able to be observed by an X-ray telescope. Chandra data revealed for the first time regions of varying enrichment in the galaxies: in one cloud, magnesium and silicon are 16 and 24 times as abundant as in the sun.

"These are the kinds of elements that form the ultimate building blocks for habitable planets," said Andrew King of the University of Leicester, U.K., and a study coauthor. "This process occurs in all galaxies, but it is greatly enhanced by the collision. Usually we only see the new elements

in diluted form as they are mixed up with the rest of the interstellar gas."

CfA coauthor Alessandro Baldi noted, "This is spectacular confirmation of the idea that the basis of chemistry, of planets and ultimately of life is assembled inside stars and spread through galaxies by supernova explosions."

As the enriched gas cools, a new generation of stars will form and, with the stars, new planets. Some studies indicate clouds enriched in heavy elements are more likely to form stars with planetary systems, so in the future an unusually high number of planets may form in The Antennae.

"If life arises on a significant fraction of these planets, then in the future The Antennae will be teeming with life," speculated Francois Schweizer, another coauthor, from the Carnegie Observatories in Pasadena, Calif. "A vast number of sun-like stars and planetary systems will age in unison for billions of years."

At a distance of about 60 million light-years, The Antennae system is the nearest example of a collision between two large galaxies. The collision, which began a couple hundred million years ago, has been so violent that gas and stars from the galaxies have been ejected into the two

long arcs that give the system its name. The Chandra image shows spectacular loops of 3-million-degree gas spreading out south of The Antennae. "These loops may be carrying out some of the elements dispersed by supernovas into intergalactic space," said Trevor Ponman of Birmingham University, U.K.

The Antennae give a close-up view of the type of collisions that were common in the early universe and likely led to the formation of most stars existing today. They may also provide a glimpse of the future of our Milky Way Galaxy, which is on a collision course with the Andromeda Galaxy. At the present rate, a crash such as the one now occurring in The Antennae could happen in about 3 billion years. Tremendous gravitational forces will disrupt both galaxies and reform them, probably as a giant elliptical galaxy with hundreds of millions of young sun-like stars, and possibly planetary systems.

Additional information and images are available at:

<http://chandra.harvard.edu>

and

<http://chandra.nasa.gov>

Mars Express: no signal from Beagle 2 so far

Esa@esa.int

08 January 2004 09:56

ESA's Mars Express orbiter made its first attempt to establish contact with the Beagle 2 lander, after the two spacecraft separated on 19 December 2003.

The orbiter made its first pass over the Beagle 2 landing site today at 13:13 CET, but could not pick up any signal from the tiny lander. More

attempts to contact Beagle 2 are planned in the days to come.

For further information:

http://www.esa.int/export/SPECIALS/Mars_Express/SEMZIJ374OD_0.html

ION ENGINE DESIGN PASSES KEY NASA TEST

NASANews@hq.nasa.gov

RELEASE: 03-421

A team of engineers at NASA's Jet Propulsion Laboratory, Pasadena, Calif, successfully tested a new ion propulsion engine design, one of several candidate propulsion technologies under study by NASA's Project Prometheus.

The event marked the first performance test of the Nuclear Electric Xenon Ion System (NEXIS) engine at the high-efficiency, high-power, and high-thrust operating conditions needed for use in large-scale nuclear electric propulsion applications.

The NEXIS engine was powered using commercial electrical power. Ion engines used on NASA's proposed Jupiter Icy Moons Orbiter (JIMO) will draw power from an onboard nuclear reactor. The ion engines, or electric thrusters, would propel the orbiter around three of the icy moons orbiting Jupiter, Ganymede, Callisto and Europa, to conduct extensive, close-range examinations and to determine their potential for sustaining life.

"On the very first day of performance testing, the NEXIS thruster demonstrated one of the highest efficiencies of any xenon ion thruster ever tested," said Dr. James Polk, the principal investigator for the test at JPL. "We expect the NEXIS design to demonstrate both the performance and projected lifetime necessary for the proposed Jupiter mission," he said.

The test was conducted December 12. It used the same vacuum chamber, where the Deep Space 1 ion thruster set the all time endurance record of 30,352 hours (nearly 3.5 years) of continuous operation. The NEXIS engine operated at more than 20 kilowatts, nearly 10 times that of the Deep Space 1 thruster. It is designed to process two metric tons of propellant, 10 times the capability of Deep Space 1, and operate for 10 years, two to three times the Deep Space 1 thruster life.

Team members working on the NEXIS engine also helped develop the first ion engine ever flown on NASA's highly successful Deep Space 1 mission. It validated 12 high-risk advanced technologies, among them the use of the first ion engine in space.

"The NEXIS thruster is a larger, high performance descendant of the Deep Space 1 thruster that achieves its extraordinary life by replacing the metal, previously used in key components, with advanced, carbon based materials," said Tom Randolph, NEXIS program manager at JPL.

Unlike the short, high-thrust burns of most chemical rocket engines, the ion engine emits only a faint blue glow of electrically charged atoms of xenon, the same gas found in photo flash tubes and in many lighthouse bulbs. The thrust from the engine is as gentle as the force

exerted by a sheet of paper held in the palm of your hand. However, over the long haul, the engine can deliver 20 times as much thrust per kilogram of fuel than traditional rockets.

"This test, in combination with the recent successful test of the High Power Electric Propulsion ion engine at NASA's Glenn Research Center, Cleveland, is another example of the progress we are making in developing the technologies needed to support flagship space exploration missions throughout the solar system and beyond," said Alan Newhouse, Director, Project Prometheus. "We have challenged our team with difficult performance goals and they are demonstrating their ability to be creative in overcoming technical challenges."

NASA's Project Prometheus is making strategic investments in space nuclear fission power and electric propulsion technologies. The technology may enable a new class of missions to the outer Solar System, with capabilities far beyond those possible with current power and propulsion systems. The JIMO mission could launch during the next decade and provide NASA significantly improved scientific and telecommunications capabilities and mission design options. Instead of generating only hundreds of watts of electricity like the Cassini or Galileo missions, which used radioisotope thermoelectric generators, JIMO could have up to tens of thousands of watts of power, increasing the potential science return many times over.

A team of engineers from JPL; Aerojet, Redmond, Wash.; Boeing Electron Dynamic Devices, Torrance, Calif.; NASA's Marshall Space Flight Center, Huntsville, Ala.; Colorado State University, Fort Collins, Colo.; Georgia Institute of Technology, Atlanta; and the Aerospace Corporation, Los Angeles is developing the NEXIS.

For more information about Project Prometheus on the Internet, visit:

<http://spacescience.nasa.gov/missions/prometheus.htm>

For information about JIMO on the Internet, visit:

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

Origins of words

Lens.

A lens may be a work of precision but its origins come from the humblest of vegetables, the lentil seed.

The Latin for lentil is in fact *lens*. Renaissance scientists, needing a name for the curved platelet of glass used to aid eyesight, focus the sun's rays, study the stars, or build a microscope, could think of nothing better than the resemblance between the shape of this object and that of the lentil seed. Accordingly, they gave it the New Latin name of *lens* – simply, a glass lentil seed.

Money from Jupiter?

Money, as a means of exchange and a store of value, has an ancient history: the first coins were in use in the Kingdom of Lydia, in western Turkey, around 700 BC. The word itself has a lineage that is only slightly less venerable.

It goes back to the days of ancient Rome, when the city fathers decided that they needed a mint. The chosen site was on the Capitoline Hill, in a temple dedicated to the goddess Juno, the wife and sister of Jupiter.

She was sometimes known as *Juno Moneta*, the 'warning' goddess – perhaps the Romans felt that she would warn them if their finances became shaky. (*Moneta* comes from the Latin verb *monere*, 'to warn or advise', from which we get a whole array of English words, for example *admonish*, *demonstrate*, *monitor*, *monster*, *monument*, *muster*, *premonition*, and *summon*.) The word *moneta* therefore came to refer to a mint, and then to what a mint produces – money. And so, through Old French, our word *money* derived.

Submitted by **Brian Fraser**

Interesting Question(s)...

By: **Trevor Gould**

I do hope that this set of anecdotes encourages the submission of others....

Astro-Answers

<i>Abstract</i>	<i>This notes unusual, funny and interesting questions and answers I have personally experienced in Astronomy.</i>
Halley's Comet	My wife and I were standing in a crowd watching the evening sky on Signal Hill in Cape Town in 1986. A satellite passed overhead, and a gentleman nearby called to his family "There goes Halley's Comet!"
Bruises	I was giving a slide supported talk to a Brownie Group and showed a slide of the active Sun. "What's that?" I asked. "The Sun" they answered. "What are the dark spots?" I asked. "Bruises" they answered.
Germany	While giving a talk to another Brownie Group, I asked each Brownie to pretend to be a planet. "Please, please" called one "Can I be Germany?"
Heaven	My telescope was set up at the Planetarium for the Jan 9 2001 total lunar eclipse. One couple asked me if I could see Heaven with the telescope. I told them I couldn't, but that it was worth searching for.
Future	While doing a sky-show in Swakopmund, a lady asked what instrument I was using. I told her it was a telescope. She asked "Can you see the future with that telescope?" I answered "We can't see the future, but we've got a good handle on the past" I think the answer sailed right over her head.

Do meteorites exist?	<p>We called on a landowner of a saltpan close to the Kalahari Gemsbok Park in the Northern Cape, and explained that we would like his permission to search the pan for meteorites - rocks from space.</p> <p>“Do they really exist?” he asked. After leading a number of unsuccessful expeditions, I wondered about that myself.</p>
Lights in the sky	<p>I showed my Mum a view through the telescope at the Observatory.</p> <p>“What are those little lights in the sky?” she asked.</p>
Solar Eclipse	<p>Following the June 2001 total solar eclipse visible from Lusaka, Zambia, I took my plastic eclipse glasses on a visit to my parents in Natal. I showed them how to look through the glasses and offered them to a neighbour. She put on the glasses, looked at the Sun and enquired “Is that the Moon?”</p>
Aliens	<p>One of the most common questions asked at skyshows is “Can you see the aliens?”</p>
Moon	<p>While showing the sky at the Observatory, I noticed the security guard walk past and invited him to look through the telescope. Once he had seen what it was pointed at, he asked to see the Moon, which unfortunately had already set.</p> <p>“Sometimes the Moon is full, sometimes this half, and then that half. What happens to the Moon when it is not full?” He told me his teacher had told the class that when the Moon is not full, parts of it have gone away.</p> <p>“Is this true?” he asked</p> <p>An insightful question for someone exposed to such a poor education.</p>
End of the World	<p>In the Nineties, there was a magnificent solar halo caused by upper atmosphere ice crystals. The Planetarium was inundated with calls about it. One drafted telephone answerer told a little old lady that the Sun had gone nova and we only had a few hours to live before the shock wave hit us....</p>
Solar Eclipse	<p>I was talking to my Mum about the Solar Eclipse. She asked if it would happen during the day.</p>
Naming a star after a girlfriend	<p>Dear Trevor</p> <p>For my sins, I work with an endangered species - the Romantic Man! He wants to have a celestial star named after his girlfriend for her birthday. He has some recollection that this is possible - any clues as to its possibility and the logistics of it all?</p> <p>Hi [name changed to protect the innocent],</p> <p>It's good to know that there are at least two of us.</p> <p>Naming of stars after girlfriends:</p> <p>[1] He can send me US\$10 000 and I will call any star of his choice "Hilda*" in future. He can select to replace "Hilda*" with any name later on, given the changeability of girlfriends.</p>
Solar Eclipse	<p>During the Solar Eclipse in South Africa in December 2002, one participant asked about how the eclipse occurs. When it was explained that the Moon moves in front of the Sun, she exclaimed “But how could it occur - the Moon would be new and a tiny sliver!”</p>
Mars	<p>In 2003 Mars passed closest to the Earth in recorded history: a number of people asked for the exact time of the close approach, so they could go outside and watch Mars pass by.</p>
Stargazing	<p>I held a stargazing evening at my home some years ago. To assist with retention of night vision, all the lights were out. Later, at the Observatory, I was approached by a young lady, who asked if I was Trevor Gould. When an affirmative was given, she responded “Is that what you look like with the lights on?” All conversation promptly ceased.</p>
Lunar Eclipse	<p>I asked the family whether they would like to watch a total lunar eclipse with me in the early hours of the morning. They did. I said they should get various things ready, including binoculars. My 20 year old daughter asked what she must do with the binoculars..</p>
Authority	<p>I was asked to give a talk to Brownies some years back. It was winter and I wore a windbreaker. As I came in I heard one Brownie whisper to another “Look - he's even got stars on his jacket!”</p>

NASA ANNOUNCES NEW NAME FOR SPACE INFRARED TELESCOPE FACILITY

*NASA*News@hq.nasa.gov

RELEASE: 03-414

NASA Administrator Sean O'Keefe today announced NASA's Space Infrared Telescope Facility has been renamed the Spitzer Space Telescope. It was named in honor of the late Dr. Lyman Spitzer Jr., one of the 20th century's most distinguished scientists.

Spitzer's pioneering efforts to put telescopes in space led to two successful space missions, including the Hubble Space Telescope. NASA also released the telescope's first dazzling observations.

"The Spitzer Space Telescope takes its place at the forefront of astronomy in the 21st century, just as its namesake, Dr. Lyman Spitzer Jr., was at the forefront of astronomy in the 20th," said NASA's Associate Administrator for Space Science Dr. Ed Weiler.

The telescope was launched August 25, 2003, from Cape Canaveral Air Force Station, Fla. The Spitzer Space Telescope uses state-of-the-art infrared detectors to pierce the dense clouds of gas and dust that enshroud many celestial objects, including distant galaxies; clusters of stars in formation; and planet forming discs surrounding stars. It is the fourth of NASA's Great Observatories, a program that also includes the Hubble Space Telescope, Chandra X-ray Observatory and the Compton Gamma Ray Observatory.

The new name was chosen after an international contest sponsored by NASA. More than 7,000 names and supporting essays were submitted, with more than a third coming from outside the United States. Jay Stidolph, 28, a Canadian resident of Fort Nelson, British Columbia, submitted the winning entry.

Spitzer (1914-1997) was the first to propose, in 1946, placing a large telescope in space to avoid the blurring effects of Earth's atmosphere. He then devoted the next 50 years of his career to making this vision a reality. His efforts led to

two successful NASA space telescopes: the Copernicus satellite and the Hubble Space Telescope. He also made significant contributions to the fields of stellar dynamics, the interstellar medium and plasma physics.

Spitzer served on the faculty of Princeton University for 50 years. He received numerous awards, including the Catherine Wolfe Bruce gold medal (1973); the National Academy of Sciences' Henry Draper Medal; the first James Clerk Maxwell Prize for Plasma Physics by the American Physical Society (1975); the Gold Medal of the Royal Astronomical Society (1978); the National Medal of Science (1979); and the Crafoord Prize of the Royal Swedish Academy (1985), the equivalent of the Nobel Prize for fields excluded from those awards.

In addition to being an outstanding scientist, Spitzer was an exceptional teacher, well regarded by his colleagues and students. He authored two popular reference books: *Physics of Fully Ionized Gases* and *Diffuse Matter in Space*.

Considered to be a man of incredible discipline, diligence and politeness, Spitzer also loved to mountain-climb and ski. He was a member of the American Alpine Club. His wife, Doreen Canaday Spitzer, four children and 10 grandchildren survive him.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Office of Space Science, Washington. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology in Pasadena.

For information about the Spitzer Space Telescope on the Internet, visit

<http://www.spitzer.caltech.edu/>

Spirit Hits the Sweet Spot

January 5, 2004

NASA's Mars rover Spirit has landed in Gusev Crater, and it is beaming pictures back to Earth.

NASA's Mars rover Spirit landed yesterday just where scientists hoped it would go: inside Gusev Crater, in a vast flatland perfect for roving. And, as a bonus, Mars dust is not a problem.

"My hat is off to the navigation team because they did a fantastic job of getting us right where we wanted to be," says Steve Squyres of Cornell University, principal investigator for the science payload. "We hit the sweet spot. We wanted someplace where the wind had cleared [the dust] off the rocks for us--and this is it."

The region around Spirit's landing site appears to be criss-crossed by the trails of dust devils, which have carried away dust and left gravel behind. Dust-free rocks are good, because they're easier for the rover's geology instruments to penetrate and analyze.

Spirit parachuted into Gusev Crater on January 4th at midnight Eastern Standard Time. Mission planners chose to land there because, from orbit, the crater appears to be a dried up lake bed. If, indeed, it was filled with liquid water long ago, then it might have been a habitat for ancient martian life. (Read the Science@NASA story "Destination: Gusev Crater" for more information.)

To the delight of researchers, Spirit's first pictures of its surroundings resemble dried up lake beds on Earth. The terrain is flat and peppered with small rocks. No one knows if the resemblance is more than superficial. Spirit will use its geology tools to find out.

"What we're seeing is a surface that is remarkably devoid of big boulders, at least in our immediate vicinity, and that's good news because big boulders are something we would have trouble driving over," Squyres said. "We see a rock population that is different from anything we've seen elsewhere on Mars, and it comes out very much in our favor." The flatland is well suited for roving.

At the moment, the rover remains perched on its lander platform, and the next nine days or more will be spent preparing for egress, or rolling off, onto the martian surface. The platform is tilted by only two degrees, and the front deck is only about 37 cm off the ground. With no large rocks blocking the way, the rover is in good position for egress.

The rover's initial images have excited scientists about the prospects of exploring the region after the roll-off. "This is our new neighborhood," says Squyres. And for the next three months, if all goes well, Spirit will explore it, searching the rocks and soil for clues to the mystery of Mars water, and maybe, martian life.

Spirit's twin Mars Exploration Rover, Opportunity, will reach its landing site on the opposite side of Mars on Jan. 25th to begin a similar examination of a site called Meridiani Planum. Stay tuned to Science@NASA for more about that in the weeks ahead.

SPRIT'S SURROUNDINGS BECKON IN COLOR PANORAMA

*NASA*News@hq.nasa.gov

RELEASE: 04-020

The first 360-degree color view from NASA's Spirit Mars Exploration Rover presents a range of tempting targets from nearby rocks to hills on the horizon.

"The whole panorama is there before us," said rover science-team member Dr. Michael Malin of Malin Space Science Systems, San Diego. "It's a great opening to the next stage of our mission."

Spirit's flight team at NASA's Jet Propulsion Laboratory (JPL), Pasadena, Calif., continues making progress toward getting the rover off its lander platform, but expected no sooner than early Thursday morning. "We're about to kick the baby bird out of its nest," said JPL's Kevin Burke, lead mechanical engineer for the rover's egress off the lander.

The color panorama is a mosaic stitched from 225 frames taken by Spirit's panoramic camera, or Pancam. It spans 75 frames across, three frames tall, with color information from shots through three different filters. The images were calibrated at Cornell University, Ithaca, N.Y., home institution for Dr. Jim Bell, Pancam team leader.

Malin said, "Seeing the panorama totally assembled instead of in individual pieces gives a much greater appreciation for the position of things and helps in developing a sense of direction. I find it easier to visualize where I am on Mars when I can look at different directions in one view. For a field geologist, it's exactly the kind of thing you want to look at to understand where you are."

Another new image product from Spirit shows a patch of intriguing soil near the lander in greater detail than an earlier view of the same area. Scientists have dubbed the patch "Magic Carpet" for how some soil behaved when scraped by a retracting airbag.

"It has been detached and folded like a piece of carpet sliding across the floor," said science-team member Dr. John Grotzinger of Massachusetts Institute of Technology, Cambridge.

Spirit's next step in preparing to drive onto the surface of Mars is to sever its final connection with the lander platform by firing a cable cutter, which Burke described as "an explosive guillotine." The planned sequence after that is a

turn in place of 115 degrees clockwise, completed in three steps over the next two days. If no obstacles are seen from images taken partway through that turn, drive-off is planned toward the northwestern compass point of 286 degrees.

Spirit landed on Mars Jan. 3 (EST) after a seven-month journey. Its task is to spend the next three months exploring rocks and soil for clues about whether the past environment in Gusev Crater was ever watery and suitable to sustain life. Spirit's twin Mars Exploration Rover, Opportunity, will reach Mars Jan. 25 (EST) to begin a similar examination of a site on a broad plain called Meridiani Planum, on the opposite side of the planet from Gusev Crater.

NASA JPL, a division of the California Institute of Technology, Pasadena, manages the Mars Exploration Rover project for NASA's Office of Space Science, Washington. For information about NASA and the Mars mission on the Internet, visit:

<http://www.nasa.gov>

Additional information about the project is available on the Internet at:

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

Mission information is also available from Cornell University, at:

<http://athena.cornell.edu>

SPRIT CONDITION UPGRADED AS TWIN ROVER NEARS MARS

NASA News@hq.nasa.gov

RELEASE: 04-036

Hours before NASA's Opportunity rover reaches Mars, engineers have found a way to communicate reliably with its twin, Spirit.

Engineers are working to get Spirit's computer out of a cycle of rebooting many times a day. Spirit's responses to commands sent Saturday morning confirmed a theory the problem is related to the rover's two "flash" memories or software controlling those memories.

"The rover has been upgraded from critical to serious," said Mars Exploration Rover Project Manager Peter Theisinger at NASA's Jet Propulsion Laboratory, Pasadena, Calif. He

predicted significant work is still ahead for restoring Spirit.

Opportunity is on course for landing in the Meridiani Planum region of Mars. That point was selected months ago. Mission managers chose not to use an option for making a final adjustment to the flight path. "We managed to target Opportunity to the desired atmospheric entry point, which will bring us to the target landing site, in only three maneuvers," said JPL's Dr. Louis D'Amario, navigation team chief for the rovers.

Opportunity will reach Mars at 12:05 a.m. Sunday EST. From the time Opportunity hits the

top of Mars' atmosphere at about 5.4 kilometers per second (12,000 miles per hour) to the time it hits the surface six minutes later, then bounces, the rover will be going through the riskiest part of its mission. Based on analysis of Spirit's descent and on weather reports about the atmosphere above Meridiani Planum, mission controllers have decided to program Opportunity to open its parachute slightly earlier than Spirit did.

Mars is more than 10 percent farther from Earth than it was when Spirit landed. That means radio signals from Opportunity, during its descent and after rolling to a stop, have a lower chance of being detected on Earth. About four hours after the landing, news from the spacecraft may arrive by relay from NASA's Mars Odyssey orbiter. However, that will depend on Opportunity finishing critical activities, such as opening the lander petals and unfolding the rover's solar panels, before Odyssey flies overhead.

Spirit has 256 megabytes of flash memory, a type commonly used on gear such as digital cameras for holding data even when the power is off. Engineers confirmed Spirit's recent symptoms are related to the flash memory, when they commanded the rover to boot up and use random-access memory instead of flash memory. The rover obeyed commands about communicating and going into sleep mode. Spirit communicated

successfully at 120 bits per second for nearly an hour.

"We have a vehicle that is stable in power and thermal, and we have a working hypothesis we have confirmed," Theisinger said. By commanding Spirit into a mode that avoids using flash memory, engineers plan to get it to communicate at a higher data rate, diagnose the cause of the problem and develop ways to restore as much function as possible.

The work on restoring Spirit is not expected to slow the steps in getting Opportunity ready to roll off its lander platform. For Spirit, those steps took 12 days. The rovers' main task is to explore landing sites for evidence in the rocks and soil to determine if past environments were watery and possibly suitable for sustaining life.

JPL, a division of the California Institute of Technology in Pasadena, manages the Mars Exploration Rover project for NASA's Office of Space Science, Washington. Images and additional information about the project are available from JPL at:

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

Information is also available from Cornell University, Ithaca, N.Y., at:

<http://athena.cornell.edu>

Opportunity Sits In A Small Crater, Near A Bigger One

*NASA*News@hq.nasa.gov
NEWS RELEASE: 2004-037

A small impact crater on Mars is the new home for NASA's Opportunity rover, and a larger crater lies nearby. Scientists value such crater locations as a way to see what's beneath the surface without needing to dig.

Encouraging developments continued for Opportunity's twin, Spirit, too. Engineers have determined that Spirit's flash memory hardware is functional, strengthening a theory that Spirit's main problem is in software that controls file management of the memory. "I think we've got a patient that's well on the way to recovery," said Mars Exploration Rover Project Manager Pete Theisinger at NASA's Jet Propulsion Laboratory, Pasadena, Calif.

Opportunity returned the first pictures of its landing site early today, about four hours after

reaching Mars. The pictures indicate that the spacecraft sits in a shallow crater about 20 meters (66 feet) across.

"We have scored a 300-million mile interplanetary hole in one," said Dr. Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the science instruments on both rovers.

NASA selected Opportunity's general landing area within a region called Meridiani Planum because of extensive deposits of a mineral called crystalline hematite, which usually forms in the presence of liquid water. Scientists had hoped for a specific landing site where they could examine both the surface layer that's rich in hematite and an underlying geological feature of light-colored layered rock. The small crater appears to have

exposures of both, with soil that could be the hematite unit and an exposed outcropping of the lighter rock layer.

"If it got any better, I couldn't stand it," said Dr. Doug Ming, rover science team member from NASA Johnson Space Center, Houston. With the instruments on the rover and just the rocks and soil within the small crater, Opportunity should allow scientists to determine which of several theories about the region's past environment is right, he said. Those theories include that the hematite may have formed in a long-lasting lake or in a volcanic environment.

An even bigger crater, which could provide access to deeper layers for more clues to the past, lies nearby. Images taken by a camera on the bottom of the lander during Opportunity's final descent show a crater about 150 meters (about 500 feet) across likely to be within about one kilometer or half mile of the landing site, said Dr. Andrew Johnson of JPL. He is an engineer for the descent imaging system that calculated the spacecraft's horizontal motion during its final seconds of flight. The system determined that sideways motion was small, so Opportunity's computer decided not to fire the lateral rockets carried specifically for slowing that motion.

Squyres presented an outline for Opportunity's potential activities in coming weeks and months. After driving off the lander, the rover will first

examine the soil right next to the lander, then drive to the outcrop of layered-looking rocks and spend considerable time examining it. Then the rover may climb out of the small crater, take a look around, and head for the bigger crater.

But first, Opportunity will spend more than a week -- perhaps two -- getting ready to drive off the lander, if all goes well. Engineering data from Opportunity returned in relays via NASA's Mars Odyssey orbiter early this morning and at midday indicate the spacecraft is in excellent health, said JPL's Arthur Amador, mission manager. The rover will try its first direct-to-Earth communications this evening.

The main task for both rovers in coming months is to explore the areas around their landing sites for evidence in rocks and soils about whether those areas ever had environments that were watery and possibly suitable for sustaining life.

JPL, a division of the California Institute of Technology in Pasadena, manages the Mars Exploration Rover project for NASA's Office of Space Science, Washington. Images and additional information about the project are available from JPL at

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

and from Cornell University, Ithaca, N.Y., at

<http://athena.cornell.edu>

HEALTHIER SPIRIT GETS BACK TO WORK

NASA News@hq.nasa.gov

RELEASE: 04-045

NASA's Spirit rover on Mars has resumed taking pictures as engineers continue work on restoring its health. Meanwhile, Spirit's twin, Opportunity, extended its rear wheels backward to driving position last night as part of preparations to roll off its lander, possibly as early as overnight Saturday-to-Sunday.

Spirit shot and transmitted a picture yesterday to show the position of its robotic arm. "The arm is exactly where we expected," said Jennifer Troser, mission manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif. It is still extended in the same position as when the rover developed communication and computer problems on Jan. 22. A mineral-identifying instrument called a Moessbauer spectrometer, at

the tip of the arm, is positioned at a rock nicknamed Adirondack.

Engineers have been carefully nursing Spirit back toward full operations for the past week. They are sending commands today for the rover to begin making new scientific observations again, starting with panoramic camera images of nearby rocks. Today's commands also tell the rover to send data stored by two instruments since they took readings on Adirondack last week -- the Moessbauer spectrometer and the alpha particle X-ray spectrometer, which identifies the chemical elements in a target.

"We know we still have some engineering work to do, but we think we understand the problem well enough to do science in parallel with that

work," Trosper said. Several attempts to get a full trace of data related to the rover's problem have only partially succeeded. The engineers might choose to reformat the rover's flash memory in the next few days. A health check of Spirit's camera mast is on the agenda for today. Another health check, of an actuator motor for a periscope mirror of the miniature thermal emission

spectrometer, is planned for Friday.

Halfway around Mars from Spirit, Opportunity's lander platform successfully tilted itself forward by pulling airbag material under the rear portion of the lander then flexing its rear petal downward. "What this did is drive our front edge lower," said JPL's Matt Wallace, mission manager. "The tips of the egress aid (a reinforced fabric ramp) are now in the soil. That makes egress look perfect. It's going to be an easy ride." The rover also retracted a lift mechanism underneath the rover, to get it out of the way for the egress, or drive-off.

During Opportunity's sol 6, the martian day that started today at 1:26 p.m. EST, the rover will be commanded to lower the middle pair of its six wheels and to release its robotic arm from the latch that has held it since before launch.

Opportunity used its miniature thermal emission spectrometer on a portion of the landing neighborhood that includes a rock outcrop. The instrument identifies the composition of rocks and soils from a distance. Opportunity did not return the data from those observations before going to sleep for the martian night, but may later today.

The rovers' main task in coming weeks and months is to explore their landing sites for evidence in the rocks and soil about whether the sites' past environments were ever watery and possibly suitable for sustaining life.

For information about the Mars mission and NASA on the Internet, visit:

<http://www.nasa.gov>

JPL, a division of the California Institute of Technology in Pasadena, manages the Mars Exploration Rover project for NASA's Office of Space Science, Washington. Images and additional information about the project are available from JPL at:

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

For Sale

Meade

LXD55 - 5" Refractor packed with :

Autostar 497 fully upgraded to 31EE Bios

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EQ mount + Tripod

Price: **R12000-00** not neg

Contact: **Kevin.**

Home number 016 362-3429

Cell 083 327-3455

E-mail Bus: kevin.pearce@liberty.co.za

E-mail Private: pearcek@execnet.co.za

Dear Star Gazers!

I have a night sky 6 inch ORION telescope which is 4 years old but has been packed away for more than 3 of those years. I cannot leave it set-up as I do not have the room. Jan Hers set it up for me.

I paid R6,000-00 for it and would like to know if there is somebody out there that would like to buy it from me. I live near Sedgefield in the Cape, my name is Pamela Pelser and my email address is xelajenn@intekom.co.za

My telephone number is (044) 883-1008

It also comes with a computer CD and I have a great Collins book to go with it.

Kind regards
Pamela



Our annual Telescope and Astronomy Expo!

Saturday, 24 April 2004
10 am to 9pm (Star Party from 6pm)

VENUE: SA Military History Museum - Johannesburg

Theme for this year is '**Life in the Universe**'

Please diarise and advertise the date,
contact us if you want to exhibit your self-made telescope or accessory,
want to enter the astrophotography competition, or
just want to offer your help on the day.

Contact Brian (brian.fraser@macsteel.co.za), Chris (Chris.Stewart@alcatel.co.za), or Lerika (lerika@icon.co.za) or check-out the website in due course for more detail.

<http://www.assajhb.co.co>

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26mm Series 4000 Super Plossl
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Imported complete with JMI Hard Case worth \$450
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Price: R34,000-00

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Cell: 082-411-6373

Email: ywain@penberthy.co.za



This case is usable with the Meade 10" LX200 (both GPS and non-GPS versions), as well as older 10" Meade telescopes. The following fork-mounted telescopes should also fit inside the case with a small amount of space between the fork arms and the foam: the Meade 2120, 10" LX3/LX5/LX6/Premier Series/LX50, LX200 7" Maksutov-Cassegrain, and the Celestron Ultima 9.25". Some small cuts in the foam may be needed for the fork arms and/or control panel with these non-LX200 scopes.

The Sky this Month

Diary of Astronomical Phenomena :- 2004

February 2004

dd hh	dd hh
2 10 Neptune in conj. with Sun	20 09 NEW MOON
3 04 Saturn 4.3 S of Moon	20 09 Uranus 4.2 N of Moon
6 08 FULL MOON	22 02 Uranus in conj. with Sun
8 14 Jupiter 3.2 S of Moon	23 19 Venus 3.0 N of Moon
13 13 LAST QUARTER	26 01 Mars 0.9 N of Moon Occn.
15 09 Mercury 2.0 S of Neptune	26 23 Mercury 1.5 S of Uranus
16 08 Moon at perigee	28 03 FIRST QUARTER
19 00 Neptune 5.2 N of Moon	28 11 Moon at apogee
19 12 Mercury 2.9 N of Moon	

March 2004

dd hh	dd hh
1 10 Saturn 4.4 S of Moon	20 18 Mercury greatest brilliancy
4 00 Mercury in superior conjn.	20 23 NEW MOON
4 05 Jupiter at opposition	22 05 Mercury 3.5 N of Moon
6 15 Jupiter 3.2 S of Moon	24 21 Venus 2.2 N of Moon
6 23 FULL MOON	24 22 Pluto stationary
7 14 Saturn stationary	26 00 Mars 0.9 S of Moon Occn.
12 02 Moon at perigee	27 07 Moon at apogee
13 21 LAST QUARTER	28 19 Saturn 4.7 S of Moon
17 09 Neptune 5.2 N of Moon	28 23 FIRST QUARTER
18 20 Uranus 4.3 N of Moon	29 11 Mercury greatest elong. E(19)
20 07 Equinox	29 13 Venus greatest elong. E(46)

LOCAL TIMES of RISE and SET for the MAJOR PLANETS, 2004

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
Feb 10	5.50 18.54	4.33 18.03	8.54 20.59	11.21 22.32	20.14 7.54	16.04 2.36
Feb 20	5.57 18.46	5.09 18.21	9.07 20.51	11.11 22.13	19.31 7.09	15.23 1.55
Mar 01	6.03 18.38	5.50 18.36	9.19 20.43	11.02 21.55	18.48 6.24	14.43 1.15
Mar 11	6.08 18.28	6.37 18.50	9.31 20.36	10.52 21.37	18.05 5.39	14.04 0.35
Mar 21	6.13 18.17	7.22 18.59	9.42 20.29	10.43 21.21	17.22 4.54	13.25 23.56
Mar 31	6.18 18.06	7.42 18.53	9.51 20.23	10.33 21.06	16.39 4.09	12.47 23.18