

CANOPUS

The Astronomical Society of Southern Africa

Johannesburg Centre

Monthly Newsletter for April 2000

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

Editorial

April approaches swiftly - we are already one quarter into 2000 - how time seems to be flying at present. Our Autumn skies are quite beautiful when the curtains of cloud are opened. As mentioned in the previous issue's editorial, the recent rains are a mixed blessing but they *really* do help to clear all the muck and dust out of the sky with definite benefits to those of us of an Astronomical persuasion.

The Canopus undergoes a slight change in format from this month to try to cut down the production and postage costs which have become (please forgive the pun) quite astronomical. If we are successful, we will reduce our printing costs slightly, but will almost *halve* our monthly postage costs. This should have a positive effect on our annual subscriptions and enable us to do more in the way of Centre projects such as the cleaning up of the Jacobs Dome and instrument.

We have some interesting articles for our readers this month. Danie has added a footnote to Brian's Minor Planet article from last month's issue and Chris Stewart has furnished a snippet about how easy it is to lose something of value without even trying - both of these under Letters to the Editor.

Danie revisits V651 Monocerotis after recent contact from a colleague in Mexico, and Brian supplies the Sky calendar as well as an article on GRBs. Want to know what they are??? - read the article.

A small personal observation - I really take my hat off to our ASSA colleagues in the Natal coastal areas. Having just spent 9 nights in Winkelspruit - 2 of which were clear - I have been trying to figure out how they manage to do any good observing through all that extra atmosphere. Both clear nights were really clear - not a cloud in sight, and yet the stars did not appear as clear and bright as we normally see them up here on the reef. Maybe this is just an occurrence at the coast itself, and clears up a little further inland, but I really think we are lucky up here not to have that extra 1800 metres of atmosphere between us and the stars.

The Editor

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Committee Meetings

Committee meetings are held at 17:30 on the Monday before the monthly general meeting. Please remember that any member who has something to ask or contribute, is welcome to attend the committee meeting. The only stipulation is that you should please inform the Chairman of your intention in order to allow the committee members to prepare for your proposal/contribution.

This year's AGM and Bring 'n Braai

Last year we held a braai as part of our AGM and the smallish turnout notwithstanding, it was a quite successful. So going by the feedback we have received in this regard, it has been decided that the A.G.M. will be held at 19:00 on Saturday the 15th of July in the Sir Herbert Baker Library.

Please note the earlier starting time of 19:00. The meeting will run between 19:00 and 20:00 and then we will retire to the Braai area to partake of whatever gastronomic delights we can create. The domes will also be opened for whomever is interested in viewing the wonders of the Wintery night sky. With a bit of luck, we may be able to persuade Tony to open the 26" as well.

New Members

We would like to welcome the following new members:- **Mark Jansen, William Doepel and Dorin Fermo**. Greetings to all of you, and we wish you clear skies.

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 803-8291 if you are interested.

Variable of the Month:

Revisiting 0704-00 V651 Monocerotis.

The reason for the revisit is a letter which I received last week from Rafael Costero, an astronomy professor at the University in Mexico City. In his letter he mentions that which he prefers to call the "eclipses" "occultations" presumably because the body causing the darkening is not solid. It is a most intriguing system and we, as amateurs, can help to solve the riddle as to what makes it tick by observing the system nightly and reporting any sign of the occultations resuming.

If space permits, I'll ask our Editor to print the following extract from the 1999 March Canopus article:

"This month's variable is on the VIP list of a number of astronomers. It was brought to the notice of the AAVSO in 1983 by Dr L Kohoutek of the Kohoutek "media comet" fame. Kohoutek pointed out that the star remains substantially constant at about magnitude 11 for long periods and then undergoes a series of eclipses lasting several months. The eclipse period is 17.2 days and the eclipses are easy to detect because the star fades to mag 13 or fainter. I imagine that unusually fast precession of the ascending node causes the eclipses to cease for many months at a time. To make it even more interesting, the star is the central star of the bipolar nebula NGC 2346."

In spite of the system's proximity to Delta Mon, beginners may have difficulty in identifying the field. Once identified and regularly observed, it will be easy. Beginners are cordially invited to visit me in order to get started on it.

Danie Overbeek.

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Star Chart

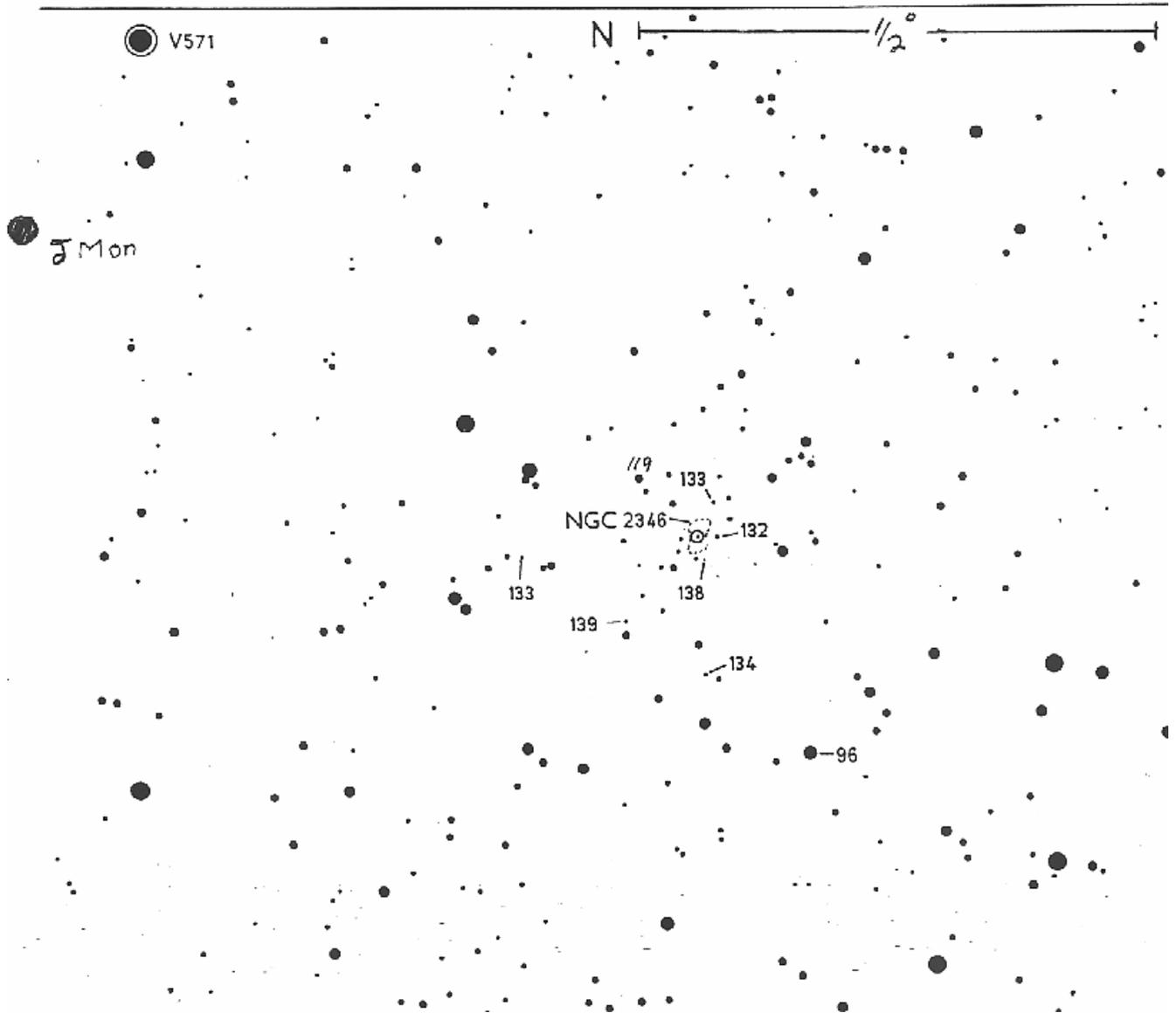
for Variable of the Month

V651 Monocerotus

0704-00 V651 Mon

RASNZ Chart 791

(1950): 07^h 06^m 49^s.641 -00° 43' 30.57"
 (2000): 07 09 22.7 -00 48.2



Snippets from the Astronomical Press

Date: Thu, 9 Mar 2000 16:30:23 -0500 (EST)

From: NASAnews@hq.nasa.gov

RELEASE: 00-36

VIEW INSIDE MARS REVEALS RAPID COOLING AND BURIED CHANNELS

Some of Mars' best kept secrets, long buried beneath the surface of the red planet, were recently revealed by instruments on NASA's Mars Global Surveyor spacecraft.

New observations of Mars reveal that the planet's flat northern lowlands were an early zone of high heat flow that later may have been the site of rapid water accumulation, according to a view of the Martian interior generated using data from Mars Global Surveyor (MGS). Elevation and gravity measurements, which have been used to probe beneath the surface of Mars, indicate a period of rapid cooling early in Martian history, and evidence for large, buried channels that could have formed from the flow of enormous volumes of water.

This global view of the Martian interior was generated from gravity measurements with the Radio Science experiment and elevation measurements from the Mars Orbiter Laser Altimeter (MOLA) instruments. Gravity and topography measurements were combined to reveal the structure of the crust on Mars, which preserves the record of melting of the interior and the heat loss from the planet over time.

"The crustal thickness map shows that, as for Earth, Mars has two distinct crustal provinces," explained Dr. Maria Zuber of the Massachusetts Institute of Technology, Cambridge, MA, and lead author of a study to be published in the March 10 issue of Science. Beneath the rough southern highlands and Tharsis volcanic province the crust, estimated at 50 miles thick, thins progressively from the South pole toward the North. In contrast, the northern lowlands and Arabia Terra region of the southern highlands have a crust of uniform thickness, about 22 miles deep.

The crustal structure accounts for the elevation of the Martian northern lowlands, which controlled the northward flow of water early in

Martian history, producing a network of valleys and outflow channels. The new gravity-field data suggest that the transport of water continued far into the northern plains. The gravity shows features interpreted as channels buried beneath the northern lowlands emanating from Valles Marineris and the Chryse and Kasei Valles outflow regions.

The features are about 125 miles wide and over a thousand miles long, with characteristics that can be explained by water flow on the surface or in a submarine environment, later buried by sediments. The large size of these channels implies that any bodies of water in the northern lowlands could have accumulated rapidly. The now-buried channels may represent the means for filling an early ocean.

The gravity and topography also provide information on the cooling of Mars over time, which bears on the early climate and history of water. "The observations suggest that the northern lowlands was a location of high heat loss from the interior early in Martian history, probably due to a period of vigorous convection and possibly plate recycling inside of Mars," said Dr. Sean Solomon, Director of the Department of Terrestrial Magnetism of the Carnegie Institution in Washington, DC, and a co-author of the study.

The high heat-loss zone corresponds to the part of Mars proposed to have been the site of an ancient ocean. The rapid transport of heat to the surface in this region would have released onto the surface and into the atmosphere gases and water or ice trapped in the interior. The time of rapid interior heat loss may correspond to the period when Mars had a warmer climate, liquid water flowed on the surface, and the planet's surface was shielded from the solar wind by a global magnetic field.

During the ongoing Mars Global Surveyor mapping mission the Radio Science and MOLA experiments will continue to collect data on a near-continuous basis through the end of the mission in February 2001. The MOLA instrument was designed and built by the Laser Remote Sensing Branch of the Laboratory for Terrestrial Physics at NASA's Goddard Space Flight Center, Greenbelt, MD. The Radio

Science experiment is implemented from the Center for Radio Astronomy of Stanford University, Palo Alto, CA. The Mars Global Surveyor mission is managed for NASA's Office of Space Science, Washington, DC, by the Jet Propulsion Laboratory, Pasadena, CA, a division of the California Institute of Technology.

Maps of the interior of Mars may be viewed at:

<http://pao.gsfc.nasa.gov/>

http://svs.gsfc.nasa.gov/imagewall/MOLA/mola_images.html

Information about the MGS Radio Science investigation can be found at:

<http://nova.stanford.edu/projects/mgs/dmwr.html>

Information about the MOLA investigation can be found at:

<http://ltpwww.gsfc.nasa.gov/tharsis/mola.html>

The MGS home page is:

<http://mars.jpl.nasa.gov/mgs/>

The Power of Jupiter

Date: Wed, 8 Mar 2000 9:54:43

Space Science News for March 8, 2000

Powerful tidal forces from Jupiter have molded two of the solar system's most bizarre worlds, fiery Io and icy Europa. Images released this week reveal new details of tidal action on the two moons.

FULL STORY at:-

http://spacescience.com/headlines/y2000/ast08mar_1.htm

SOHO SEES THROUGH THE SUN TO FIND STORMY REGIONS ON THE OTHER SIDE

Date: Tue, 7 Mar 2000 14:10:23 -0500 (EST)

From: NASAnews@hq.nasa.gov

With a new technique that uses ripples on the Sun's visible surface to probe its interior, scientists are able to see right through the Sun to observe active regions on its far side, the side facing away from the Earth. With a far-side preview, scientists may be able to have a week's advance warning of potential bad weather in space.

SOHO is a cooperative project between the European Space Agency and NASA.

HIGH RESOLUTION IMAGES SHOW BIG DIFFERENCES BETWEEN MARS POLAR CAPS

Date: Wed, 8 Mar 2000 15:30:20 -0500 (EST)
From: NASAnews@hq.nasa.gov
RELEASE: 00-35

New high-resolution images from NASA's Mars Global Surveyor spacecraft comparing the ice caps at the North and South poles show the difference between the two regions is in the "cheese." The North polar cap has a relatively flat, pitted surface that resembles cottage cheese, while the South polar cap has larger pits, troughs and flat mesas that give it a holey Swiss-cheese appearance.

"Looking like pieces of sliced and broken Swiss cheese, the upper layer of the Martian South polar residual cap has been eroded, leaving flat-topped mesas into which are set circular depressions," said Dr. Peter Thomas of Cornell University, Ithaca, NY, and lead author of the paper. "Nothing like this has ever been seen anywhere on Mars except within the South polar cap, leading to some speculation that these landforms may have something to do with the carbon dioxide thought to be frozen in the South polar region."

In a paper to be published March 9, 2000, in the journal *Nature*, members of the Mars Global Surveyor imaging team have described some of the newly discovered differences in polar terrain.

"The unusual shapes of the landforms on the North and South polar caps suggest that these regions have had different climates and histories for thousands or perhaps even millions of years," said Thomas. "We are discovering them for the first time because Mars Global Surveyor is working to provide high-resolution views of the tremendously diverse terrain on Mars over all Martian seasons."

"These landforms may be telling us what the South polar cap is made of," says Dr. Andrew Ingersoll of the California Institute of Technology, Pasadena, CA and one of the

authors of the paper. "The North residual cap - the part that survives the summer is made of water ice. The South residual cap seems to be made of frozen carbon dioxide, otherwise known as dry ice, but we don't know if this is a veneer a few meters thick or a solid block that extends down 2 or 3 kilometers. These images may help us decide."

The North polar cap is covered mainly by pits, cracks, small bumps and knobs that give it a cottage-cheese look. The pits that have developed on the surface are spaced close together relative to the very different depressions in the South polar cap. These pits probably developed slowly over successive spring and summer seasons.

"The polar images demonstrate again that understanding Mars' complicated history requires studying many areas in detail, just as understanding the Earth does," Thomas said.

"If we discovered that both polar caps are mostly water, it would leave a mystery about why there is so little carbon dioxide on Mars. Earth has a lot of carbon dioxide, but creatures living in the ocean have turned it into limestone rocks. Without oceans or life, Mars should have a lot more carbon dioxide on its surface than we seem to be finding," explained Ingersoll.

Mars Global Surveyor is managed by the Jet Propulsion Laboratory (JPL), Pasadena, CA, for NASA's Office of Space Science, Washington, DC. JPL's industrial partner is Lockheed Martin Astronautics, Denver, CO, which developed and operates the spacecraft. JPL is a division of the California Institute of Technology.

The new images can be seen at:

<http://photojournal.jpl.nasa.gov/new>
<http://www.msss.com>

Amateurs doing Real Astronomy

Gamma Ray Bursts (GRB's) are now being detected by a couple of satellites orbiting the earth. They are mysterious objects that seem to be very far away, and if so then they must be extremely energetic. They appear to be point sources that give off as much energy in seconds as all the stars in our entire galaxy emit in 100 years. There has been a campaign in recent times to try and visually detect these objects, using very large telescopes. The problem is that the GRB's are so short lived that by the time you find out that one has occurred, then it has already faded. And then, while you are detecting the event you have to try and get as accurate a position as possible so that follow-up observations know where to look.

The Variable Star Network (VSN) is now sending out notices of these events within hours of their occurrence and invite interested parties to look for the optical remnants, and a number of astronomers are doing this on a

regular basis, using telescopes of about 1 metre upwards.

However a group of four amateurs in the USA have just released CCD images of the afterglow of a GRB (GRB0301), which they detected with a 12-inch home-made telescope at their club in Buffalo. The object was about mag 20 at the time and they managed this by "stacking" 12 5-minute exposures together. This appears to be the first amateur observation of a GRB and it was made with a backyard telescope. It is a good example of what can be done by amateurs with just a little serious effort.

The AAVSO and Sky&Telescope will be carrying coverage of this remarkable achievement in the forthcoming months and will be encouraging other amateurs who may be interested in attempting similar observations.

Brian Fraser

Shepherd Moons, Lost and Found + a space weather alert

Date: Tue, 7 Mar 2000 0:33:33

Space Science News for March 7, 2000

Lost and Found: Two moons of the gas giant Uranus have been missing for 14 years. Now scientists have re-discovered the long-lost satellites. FULL STORY at

http://spacescience.com/headlines/y2000/ast07mar_1.htm

Planets in a Test Tube

Date: Mon, 6 Mar 2000 12:58:45 -0600

NASA Space Science News for March 6, 2000

Planets in a Test Tube: What do the racing winds on Jupiter and the snail's pace circulation of molten rock inside the Earth have in common? They're all fluids whose movements were simulated in a "planet in a test tube" flown aboard the Space Shuttle in 1985 and 1995. Results from the experiments have recently been published in a NASA report.

FULL STORY at:- http://science.nasa.gov/headlines/y2000/msad03mar_1.htm

Gene Shoemaker honoured

Date: Tue, 14 Mar 2000 12:10:21 -0500 (EST)

From: NASAnews@hq.nasa.gov

RELEASE: 00-38

NASA Renames NEAR Spacecraft for Planetary Science Pioneer GENE SHOEMAKER

The NASA satellite conducting the first-ever close-up study of an asteroid will be renamed to honor Dr. Eugene M. Shoemaker, a legendary geologist who influenced decades of research on the role of asteroids and comets in shaping the planets. The Near Earth Asteroid Rendezvous (NEAR) spacecraft, currently orbiting asteroid 433 Eros more than 145 million miles from Earth, will now be known as NEAR Shoemaker.

"Gene Shoemaker was an inspirational, charismatic pioneer in the field of interplanetary science," said Dr. Carl B. Pilcher, Director of Solar System Exploration at NASA Headquarters, Washington, DC. Pilcher announced the new name today during the Lunar and Planetary Science Conference in Houston. "It is a fitting tribute that we place his name on the spacecraft whose mission will expand on all he taught us about asteroids, comets and the origins of our solar system. "

Shoemaker died in a 1997 car accident in the Australian outback while on an annual study of asteroid impact craters. With his wife and research partner, Carolyn, Shoemaker was part of the leading comet discovery team of the past century, perhaps most famous for finding the comet (Shoemaker-Levy 9) that broke up and collided with Jupiter in 1994.

He was an expert on craters and the impacts that caused them. Shoemaker's work on the nature and origin of Meteor Crater in Arizona in the 1960s laid the foundation for research on craters throughout the solar system. He also established the lunar geological time scale that

allowed researchers to date the features on the moon's surface.

Though he never realized his dream of tapping a rock hammer on the moon, Shoemaker taught Apollo astronauts about craters and lunar geology before they left Earth. Last year, when NASA's Lunar Prospector spacecraft crashed on the Moon in an experiment at the end of its mission, a small vial of Shoemaker's ashes, carried aboard the spacecraft, was scattered on the lunar surface.

Shoemaker was a key member of the 1985 working group that first studied the NEAR mission, defining its science objectives and designing a conceptual payload. Many of the group's recommended instruments were included in the actual spacecraft, which only a month into its yearlong orbit of Eros is already returning fascinating data on the asteroid's surface and geology.

The first in NASA's Discovery Program of low-cost planetary missions, NEAR launched from Cape Canaveral Air Station, FL, on Feb. 17, 1996. After a four-year journey that included flybys of Earth (Jan. 1998) and asteroids Mathilde (June 1997) and Eros (Dec. 1998), NEAR began orbiting Eros on Feb. 14, 2000. The car-sized spacecraft will observe the asteroid from various distances -- coming within several miles of the surface -- before the mission ends in February 2001. The Johns Hopkins University Applied Physics Laboratory in Laurel, MD, designed and built the NEAR spacecraft and manages the mission for NASA's Office of Space Science.

Letters to the Editor

The Editor
Canopus

Congratulations to Brian Fraser for his interesting minor planet article. Canopus could do with more local input such as that which we receive from Brian and Eben van Zyl.

Here is a footnote to Brian's list of Johannesburg-related minor planets: How many Canopus readers know that a minor planet was named after a Johannesburg Centre member? Younger members may not know too much about Jack Bennett, discoverer of two comets and a supernova.

Jack was a member of both the Jhb and Pretoria Centres and attended some of our meetings. His discoveries were made with modest equipment in a fairly light polluted environment and were the result of sheer, enlightened perseverance.

On 1986 November 4 the distinguished amateur/professional Rob McNaught of Siding Spring, NSW discovered a minor planet which was provisionally named VD 4093. Rob recommended to the International Astronomical Union that his discovery be named Bennett.

By the time that Rob telephoned with the good news, Jack was already a paraplegic in a Pretoria nursing home and I am sure that the news did much to lighten the last few months of life of a man who can only be described as having had a sweet nature.

Best wishes

Danie Overbeek.

Hi Chris,

Here's something for you:

Date: Mon, 6 Mar 2000 14:20:52 PST

Subject: Boeing loses space station parts

Two nitrogen and oxygen tanks (worth \$750,000) still in their crates (5 feet on a side) for use by space-station astronauts were apparently accidentally sent off to the Huntsville dump after being moved outdoors temporarily to make room inside the Boeing plant.

http://dailynews.yahoo.com/h/ap/20000303/sc/space_station_trash_1.html

Cheers,
Chris (Stewart)

Hmmmmm - somebody accidentally lost ±5 million Rands Just think; at the beginning of last year we could have purchased the Old Observatory site for that same amount Ed.

In the Sky this Month

April 2000

dd hh

2 12 Mercury 1.5 N of Moon
 3 05 Venus 2.7 N of Moon
 4 18 **NEW MOON**
 6 10 Mars 5.5 N of Moon
 6 10 Jupiter 4.4 N of Moon
 6 21 Saturn 3.0 N of Moon
 6 23 Mars 1.1 N of Jupiter
 8 20 Moon at perigee

dd hh

11 13 **FIRST QUARTER**
 16 23 Mars 2.4 N of Saturn
 18 18 **FULL MOON**
 24 11 Moon at apogee
 26 18 Neptune 0.9 N of Moon Occn.
 26 20 **LAST QUARTER**
 27 22 Uranus 1.2 N of Moon
 28 08 Mercury 0.4 S of Venus

May 2000

dd hh

3 07 Venus 4.0 N of Moon
 3 14 Mercury 4.3 N of Moon
 4 04 **NEW MOON**
 4 07 Jupiter 4.2 N of Moon
 4 12 Saturn 2.9 N of Moon
 5 06 Mars 4.9 N of Moon
 6 09 Moon at perigee
 8 04 Jupiter in conj. with Sun
 8 08 Neptune stationary
 8 21 Mercury 0.9 N of Jupiter
 9 03 Mercury in superior conjn.
 10 03 Mercury 2.3 N of Saturn
 10 20 **FIRST QUARTER**
 10 20 Saturn in conj. with Sun

dd hh

14 07 Mercury greatest brilliancy
 17 10 Venus 0.1 N of Jupiter
 18 08 **FULL MOON**
 18 20 Venus 1.3 N of Saturn
 19 02 Mars 6.1 N of Aldebaran
 19 12 Mercury 7.2 N of Aldebaran
 19 17 Mercury 1.1 N of Mars
 22 01 Moon at apogee
 24 02 Neptune 1.3 N of Moon
 25 06 Uranus 1.5 N of Moon
 25 12 Uranus stationary
 26 12 **LAST QUARTER**
 31 11 Jupiter 1.2 N of Saturn

LOCAL TIMES of RISE and SET for the MAJOR PLANETS, 2000

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 10	06.22	17.56	04.31	16.52	05.09	17.13	08.05	19.07	07.56	19.04	08.20	19.26
Apr 20	06.27	17.46	05.01	16.58	05.24	17.09	07.59	18.51	07.27	18.32	07.46	18.50
Apr 30	06.32	17.38	05.45	17.10	05.40	17.06	07.53	18.37	06.59	18.01	07.12	18.15
May 10	06.37	17.31	06.42	17.34	05.56	17.05	07.46	18.23	06.30	17.29	06.39	17.40
May 20	06.43	17.26	07.44	18.10	06.14	17.07	07.39	18.10	06.02	16.58	06.05	17.05
May 30	06.48	17.23	08.27	18.44	06.31	17.11	07.31	17.58	05.33	16.27	05.31	16.30