



WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society



Number 139

February 2001

Official website: www.worthingastro.freereserve.co.uk Affiliated websites: www.observatory99.freereserve.co.uk, www.damocles.freereserve.co.uk

ALMANAC

All times U.T. February / March

		LUNAR		
February	Date	Time	rise	set
	Full Moon	8th	07.12	17.17 07.54
	Last Quarter	15th	03.24	01.18 10.43
	New moon	23rd	08.21	07.30 17.32
March				
	First Quarter	3rd	02.03	10.27 01.49
	Full Moon	9th	17.23	17.35 06.50
	Last Quarter	16th	20.45	01.22 09.44
	New moon	25th	01.21	06.33 18.48

13th	Uranus discovered 1781.
15th 21	Mars 2° S. of moon
18th 03	Pluto at stationary point
22nd 20	Mercury 2° N. of moon
25th 16	Venus 13° N. of moon

Minima of Algol

Feb.	14th	20.24
March.	1st	04.30
	4th	01.18
	6th	22.06
	9th	19.00

		EARTH	
February		Sunrise	Sunset
	15th	07.14	17.15
	23rd	06.58	17.30
March			
	3rd	06.41	17.44
	9th	06.28	17.55
	16th	06.12	18.07
	25th	05.52	18.22

PLANETS

(As at February 23rd.)

	Constellation	Rises	Sets	Mag.
<u>Mercury</u>	Aquarius	06.04	15.50	+1.2
Unfavourable				
<u>Venus</u>	Pisces	07.39	21.27	*-4.6 *
Brilliant evening object at it's most brilliant *!*/				
<u>Mars</u>	Scorpius	01.42	10.16	+0.6
Morning object getting brighter.				
<u>Jupiter</u>	Taurus	10.00	01.43	-2.4
Evening object				
<u>Saturn</u>	Taurus	09.48	00.55	+0.1
Early evening object				
<u>Uranus</u>	Capricornus	06.38	16.12	+5.9
Unfavourable				
<u>Neptune</u>	Capricornus	05.59	14.55	+8.0
Unfavourable				
<u>Pluto</u>	Ophiuchus	01.47	11.50	+13.8
Morning object				

PHENOMENA

		February	
Day	Hour		
15th	11	Mars 3° S. of moon	
21st	19	Mercury 6° N. of moon	
22nd	01	Venus at greatest brilliancy	
25th	16	Mercury at stationary point	
26th	17	Venus 10° N. of moon	
		March	
1st	19	Saturn 2° N. of moon	
2nd	10	Jupiter 3° N. of moon	
9th	01	Venus at stationary point	
9th		Yuri Gagarin born 1934	
11th	07	Mercury at greatest elongation W. 27°	

Lunar Occultations					
Times as at W.A.S. Observatory					
Date	U.T.	Z.C.No	Mag	Phase	
Feb.	h. m. s.				
28th	18.25.17	401	6.3	diss	
March					
2nd	23.05.16	697	6.5	diss	
4th	00.05.47	847 *	3.0	diss	
4th	01.01.16	847 *	3.0	reapp	
4th	20.49.40	1001	7.3	diss	
5th	00.16.17	1021	6.1	diss	
6th	00.06.08	1163	7.9	diss	
6th	20.40.04	1288	7.8	diss	
6th	21.30.46	1295	6.4	diss	
6th	21.33.41	1296	6.6	diss	
6th	22.05.34	1302	6.8	diss	
6th	22.07.44	1298	6.4	diss	
6th	22.25.13	1305	6.9	diss	
12th	02.42.33	1950	5.7	reapp	
14th	03.49.50	2196	6.5	reapp	
17th	04.59.07	2597	7.5	reapp	

This is only about 10% of the predictions for the W.A.S. Observatory. If you are interested there are some Occultation's of Planets later in the year so get in some practise beforehand

* Z.C.No 847 = zeta Tauri

Planetary Report

Mercury. In inferior conjunction on Feb. 13th, and despite being at greatest elongation W. 27° on the 11th remains too close to the Sun for observation.

Venus. A brilliant evening object visible before sunset and at it's most brilliant on the 22nd Feb, and heading for inferior conjunction on the 30th March. Note the changing phase of the planet over the next few months.

Mars. A morning object in Scorpius, moving into Ophiuchus, and passing 5° N. of Antares on the 4th March.

Jupiter and Saturn. At Mag -2.4 and +0.1 respectively are gradually fading and moving apart in Taurus, as they move away from us and get smaller

Uranus and Neptune. Both unsuitably placed.

Editors Note

Thanks to all those old and new who contributed to Was News this month, and also in a change from the normal broadcast I've decided not to moan at, berate, or chide anyone about not **WRITING AN ARTICLE** this month, I'm sure you'll all be impressed at my self-control.

Rob

Apology

Brian Halls

There was a delay in sending out some of the Was News in January. I would like to apologise for anyone who got the newsletters late last month. This was due to photocopying problems.

If anyone who could assist in the reproducing of the newsletter, please let me know.

Dates for your Diary

Lunar & Planetary Photographic Evenings at the Observatory

Graham L. Boots

Those wishing to undertake photography of Jupiter, Saturn, Venus and the Moon please come to the Observatory (weather permitting) around 7.00 p.m. on the dates listed below. The Celestron 8 f10 Schmidt/Cassegrain will be in use at prime focus and eyepiece projection method with and without filters. Speed of film (not supplied) can be anything between 50 and 400 ISO colour or black and white. Adapters are available for your own single lens reflex (SLR) camera. I regret automatic cameras are not suitable but we are able to supply SLRs on site. If in doubt about seeing conditions on the evenings please telephone me on 01903 505346.

Monday 26th February 2001 3 day old Moon

Wednesday 28th February 2001 5 day old Moon

Astrophotographic Night

Alex Vincent

I am doing some astrophotographic nights on Mondays starting at 8.00PM at the Hill Barn Golf Club's car park for those who wish to photograph star fields, meteors, conjunctions etc. Dates for your diary are Feb 19th, 26th and March 2001. Bring along a camera and tripod. Also at the observatory on Fridays starting at 7.00pm for those who wish to photograph the planets and the moon through telescopes are welcome to do so. Hope for clear skies.

Minimum of Zeta Aurigae

Alex Vincent

The star Zeta Aurigae or Sadatoni is an eclipsing binary with a period of 972 days. The system comprises of a red supergiant over 200 million miles in diameter and a blue dwarf some 3 million miles in diameter. The magnitude at maximum is 3.7 and drops down to 4.2 at minimum and so its amplitude is rather small. The Duration of eclipses is 40 days with about 38 days being total.

Zeta Aurigae's next date of minimum will be on March 28th 2001 and so observations should be made from March 7th to April 18th. When eclipses of this star begin or end, there is a period when the light of the primary (dwarf star) comes to us when passing through the rarefied outer layers of the secondary. It lies close to the other eclipsing binary star 'Epsilon Aurigae' which has a period of 9892 days.

Comet Mcnaught-Hartley (1999 T1)

Alex Vincent

Date	R.A.		Dec.		Mag.
	h	m	°	'	
Feb 15 th	17	01.7	29	32	7.3
Feb 20 th	17	14.9	34	12	7.5
Feb 25 th	17	27.8	38	39	7.6
Mar 2 nd	17	40.1	42	48	7.8
Mar 7 th	17	52.0	46	40	8.0
Mar 12 th	18	03.2	50	13	8.2
Mar 17 th	18	13.7	53	28	8.4

The above co-ordinates are for Epoch 2000

The comet becomes circumpolar from the end of February and it is 1.4 magnitudes brighter than predicted.

Solar Section Report

By Section Director, Brian Halls

December 2000

27 – November – 3 December

Sunspot region 9246 (S12⁰, L = 248⁰, class/area Eai/220 on 30 November) was moderate in size and magnetic complexity and in a development phase until 01 December, then stabilized. It produced a C9/Sf flare at 29/0629 UTC with an associated Type II radio sweep. Activity rose to moderate levels on 30 November as Region 9246 produced an M1/Sf flare at 30/2038 UTC. It may have also been responsible for an optically uncorrelated M1 X-ray flare at 30/0925 UTC. Activity was low during the rest of the period due to isolated C-class X-ray flares, most of which were optically uncorrelated.

4 - 10 December

Sunspot activity was quite low during the first full week of the month. Region 9246 (S12⁰, L = 248⁰, class/area Eao/250 on 7 December) produced a bright flare on 6 December at 22.30UT. Region 9246 was of moderate size and magnetic complexity, but gradually decaying at the time of this flare.

11 – 17 December

Sunspot activity increased during the mid month period. Active region 9267 (N08⁰, L = 083⁰, class/area Dai/210 on 15 December) produced the only M-class flare of the period, an M1/1f on 12 December at 15.07 UT. This region exhibited minor growth prior to the M-flare. Occasional C-class flares occurred during the rest of the period from a variety of regions that were mostly unremarkable. One notable exception was Region 9276 (S15⁰, L = 114⁰, class/area Dao/120 on 17 December), which emerged on 16 December, then grew at a moderate pace as it produced numerous flares.

18 – 24 December

Activity was low through 23 December with some flare activity among the visible regions. A few of these regions were of moderate size and complexity including Regions 9269 (N14⁰, L = 034⁰, class/area Dao/260 on 17 December), 9280 (N09⁰, L = 299⁰, class/area Eki/560 on 24 December), and 9283 (S14⁰, L = 256⁰, class/area Dai/200 on 24 December).

25 – 31 December

Sunspot region 9289 (S07⁰, L = 201⁰, class/area Eki/890 on 30 December) was an active sunspot group during the last week of the year. It produced a number M type flares on 26th, 27th, and two on the 29th.

This region, which also produced occasional C-class subflares, was large with a minor degree of magnetic complexity. Region 9283 (S11⁰, L = 259⁰, class/area Dao/240 on 27 December) also possessed a minor degree of magnetic complexity and produced occasional C-class flares including a C3/Sf on 27December at 04.00 UT. Region 9283 was slowly decaying at the close of the period. Other events of interest included a spectacular full-halo Coronal Mass Ejection around midday on 28 December, which was determined to be from a source on the back side of the Sun.

Members of the Society battled the elements to make observations of the Sun on 12 days in December. Observations were received from Nick and Graham.

WAS MDF = 6.16 R = 87.2
BAA MDF = 6.83 R = 108.5
AAVSO R = 131.5

Aurora: Explaining the Explainable

Bob Turner

One of nature's most beautiful and spectacular sights is the Polar Aurora, more popularly known as the northern and southern lights.

The lights extend across the sky in a series of bands, arcs, arches, veils and filaments. Sometimes sharply defined, sometimes diffuse but always impressive. Colours range from white to yellow, red, green and blue. and several colours may be present at the same time in the same in the same structure.

In real time the structures of the aurora change rapidly and as they are very faint they become exceedingly difficult to photograph. A normal camera will photograph between 100 to 1,000 ASA while a video camera operates between 1,000 to 5,000 ASA but to capture the aurora successfully, so as not to get movement, you need about 1,000,000 ASA.

The eye however has no such restriction and only directly viewing will show the beauty of this wonderful effect.

Aurora form in an oval around the poles about 20° to the sunward side and about 30° to the night side and the Earth rotates under these ovals every 24 hours.

The lights as we see them are being formed in a similar way to what's going on in a neon light tube used in advertising signs but they are a great deal bigger

extending from 50 miles above the Earth's surface to nearly 400 miles up.

Between 60 to 150 miles the colour is predominately green but will show white, yellow or blue and above 150 miles the main colour is red. At the very bottom at 50 miles the aurora can take on a pink fringe which is a mixture of red and blue.

The effect is caused by charged particles driven off the Sun arriving in our upper atmosphere and colliding with the atoms of nitrogen and oxygen that form our air. The aurora normally stays within the oval at each pole but if there is a severe storm on the sun additional charged particles reaching us increases the activity and drives the aurora to lower latitudes in the north and higher latitudes in the southern hemisphere.

Solar storms have over the years have created aurora that have been reported at very low latitudes. Tiberius Caesar thought Ostia was burning viewed from his palace in Rome and sent the army to put out the fire and many other references exist in Greek and Chinese sources.

Material, mainly charged protons and electrons, flowing out from the Sun approach the Earth and are effected by the planets magnetic field which deflects them away from the Earth creating a vast magnetotail down wind.

This magnetic sheath is about 40 to 60 Earth radii wide and over 1,000 Earth radii long.

Because of the Earth magnetic field the top lobe has a different polarity from the bottom or southern lobe. These lobes are separated by a sheet of electric current that flows across the mid plane of the tail.

This system however leaks at the poles and allows some of the charged particles to enter the Earth's atmosphere causing the aurora.

The charged particles collide with oxygen and nitrogen atoms which absorb the energy and then immediately re-emit the energy at a discrete frequency.

The principal emission lines are molecular nitrogen at 3914 and 4278 angstroms, atomic oxygen at 5577, 6300 and 6364 angstroms and atomic nitrogen at 6611 and 6768 angstroms which accounts for the distinctive colours. Wavelengths in angstroms define the colours of each frequency going through the spectrum from red to blue as the frequency diminishes.

So the aurora has become an indicator of Solar storms occurring about a day behind the event and have therefore become somewhat predictable. Most people

however have never seen this great night time spectacle due to the amount of street lighting which completely floods out the auroral lights.

Further to Brian Halls mention of the SETI project in last months WAS News, I thought the following article may be of interest.

Ed.

To boldly go, on screen

The search for extraterrestrial life is reaching homes via software for personal computers

Charles W. Petit

Imagine that, when no one is looking, perhaps in the dead of night, a personal computer stirs into action and, within its self-awakened processor, there emerges a message by an alien intelligence originating in a world far, far away.

This is not a sci-fi plot device. It could happen, and you might enjoy it. In what is expected to be the biggest attempt ever to harness the combined computing horsepower of hundreds of thousands of desktops, laptops, and other small computers, a partnership of radio astronomers, science-fiction movie makers, and space buffs is proposing to distribute special, alien-hunting screen savers to ordinary computer users around the world. The project is called SETI@home.

The masterminds behind the device are a group of astronomers and engineers who are attached to a serious SETI—or search for extraterrestrial intelligence—project called SERENDIP, based at the University of California—Berkeley. The SERENDIP (Search for Extraterrestrial Radio Emissions from Nearby Developed Intelligent Populations) team is recording raw data gathered by the world's largest radio telescope, at Arecibo Observatory in Puerto Rico, as it scans the skies during basic astronomy research. Then they are sorting through it, searching for alien emanations buried in the static. The special twist is to share the data, via the Internet, so that anybody with any kind of moderately powerful personal computing system can be part of the monitoring.

The free screen saver includes software for analysing the data and sending results back to SERENDIP's overseers. A \$50,000 donation to the program comes from Paramount Pictures. The private Planetary Society is also providing funds, and Sun Microsystems is chipping in with free computer equipment. Already,

over 100,000 people have signed up, says SETI@home's project director, computer scientist David Anderson of the Space Sciences Laboratory at UC–Berkeley. This participation, he says, will boost SERENDIP's chances for success.

When the screen saver is running, the SERENDIP software will analyse data, looking for strong signals within unnaturally narrow ranges of wavelength. If something pops up, however, users shouldn't assume it is an alien. Most hits are likely to be from more prosaic intelligence: humanity's own radio noise. But the program will let SERENDIP's managers know if they should take a closer look. If something is found and verified, though, the owner of the relevant home computer will be among the first notified, Anderson says.

The program has so far scanned all the sky visible from Arecibo three times over. But SETI enthusiasts say it may take decades to find any alien message hidden in the radio chaff of the universe. The project's Web site is setiathome.ssl.berkeley.edu

What's on the Box

Thursday 15th February



21.00 ~ Leading Edge

Geoff Watts takes a look at the Mir space station, and at what will happen when it falls to Earth later this month.

Sunday 18th February



06.50 & 22.50 ~ Moments of Genius

Brian Cox explores the history, technology and contribution to science of a world leader in radio astronomy, the Lovell radio telescope at Jodrell Bank, Manchester.

Monday 19th February



22.30 & 00.30 ~ Reputations Special

(Yuri Gagarin: Starman) Documentary about Yuri Gagarin, the first human being in space who became a powerful symbol of success of the Communist system.

Wednesday 21st February



08.30, 20.30 & 23.30 ~ Journeys in Time and Space

(The Big Bang) Series exploring the birth and growth of the Universe. Astronomer Chris Riley visits New York to see the two mile long machine that recreates the Big Bang.

WAS News News

This months article was presented to Was News by member John Hopkins

Planet Earth On The Move

Moving 5.972 sextillion tonnes is relatively "simple"

By BBC News Online science editor Dr David Whitehouse

Man₁kind will soon have the ability to move the Earth into a new orbit, say a team of astronomers. The planetary manoeuvre may more than double the time life can survive on our planet, they believe.

Our initial analysis shows that the general problem of long-term planetary engineering is almost alarmingly feasible

Our Sun will increase its brightness in the next billion years or so, and if the Earth stays in its present orbit it will be fried and all life eliminated.

Using the well-understood "gravitational sling shot" technique that has been employed to send space probes

to the outer planets, the researchers now think a large asteroid could be used to reposition the Earth to maintain a benign global climate.

It is an "alarmingly simple" technique, the astronomers say. It could ensure humanity's survival and even allow our descendants to alter our Solar System to move moons and planets to make new Earths. The astonishing idea has been put forward by Don Korycansky, of the University of California, along with Gregory Laughlin, of the US space Agency Nasa, and Fred Adams, of the University of Michigan.

Astronomers believe that in a billion years from now our Sun will be over 10% brighter than it is today. Global climate models indicate that the Earth will react to this increase by at first becoming a "moist greenhouse".

Looking even further ahead, the Sun will increase its luminosity by about 40% in three billion years. This will force the Earth into a "runaway greenhouse" state, such as exists currently on the planet Venus.

According to the authors of a new study, this will "spell a definite end to life on our planet". But there is a way to counter the increasing brightness of the Sun, the scientists say - just increase the radius of the Earth's orbit!

"Our initial analysis shows that the general problem of long-term planetary engineering is almost alarmingly feasible," they say.

All that is required is for a large asteroid, about 100 km (62 miles) across, to fly past the Earth transferring some of its orbital energy to our planet. The asteroid would then move out to encounter Jupiter where it would acquire more energy that it could impart to the Earth on a subsequent encounter.

To expand the Earth's orbit around the Sun at a rate that compensates for the increasing brightness of the star would require an encounter every 6,000 years, or about every 240 generations.

Earth's gradual outward migration may require adjustments to be made to the orbits of other planets as well. Recent calculations of the Solar System's stability indicate that if the Earth was removed then Venus and Mercury would become destabilised in a relatively short time.

Perhaps, the authors suggest, many moons and planets could be moved into more favourable positions in the Solar System where their climates might support life.

In the past, some astronomers have suggested that Mars could be terraformed to make it more like the Earth. The Earth-orbital-migration technique, say the researchers, is a far easier way to provide living space for humans in a changing Solar System.

But it would be a procedure that required some care. If the 100 km asteroid was to collide with the Earth then it would wipe out all life on our planet. "This danger cannot be overemphasised," the researchers stress.

But "as a way of preserving the entire biosphere of the Earth, this method is promising and efficient," they say.

Old brown dwarf-like stars discovered

Royal Astronomical Society Press Release

Astronomers using the UK Infrared Telescope (UKIRT) in Hawaii have discovered two examples of a kind of star never previously observed. These small, cool stars look superficially like brown dwarfs but are actually the remnants of ordinary stars that have been whittled down to cool Jupiter-sized bodies over billions of years by spilling material over to a white dwarf companion star

Dr Steve B. Howell, Head of the Astrophysics Group at the Planetary Science Institute in Tucson, Arizona, was one of several astronomers who predicted that stars of this kind would exist in such binary star systems. Now Dr Howell, working with Dr David Ciardi of the University of Florida and UKIRT staff scientists Chris Davis and Paul Hirst, has secured the first direct evidence of such stars by taking infrared spectra with the CGS4 instrument on UKIRT of two variable binary star systems: LL Andromedae and EF Eridani. The results are to be published in *Astrophysical Journal Letters*.

The observers took advantage of periods when the flow of material between the two stars in these binary systems temporarily stops. At these quiescent times, UKIRT can distinguish the radiation coming from the cool donor star. In the case of LL Andromedae, the signature of methane was detected at a wavelength of 2.2 microns. This shows that the donor star's temperature is around 1,300 K (1000 degrees C), similar to a 'T-type' methane brown dwarf. In EF Eridani, the donor star is a little warmer at around 1,650 K (1,350 degrees C), similar to an 'L-type' brown dwarf.

According to theory, the estimated mass of these cool stars is near four hundredths the mass of the Sun, or 40 times the mass of the planet Jupiter.

Assuming that they give out about the same amount of radiation as more familiar young brown dwarfs, Howell estimates that both LL Andromedae and EF Eridani are between about 100 and 130 light years away - virtually neighbours of the solar system. To get a good feel for what these binary stars are like, Howell says "Imagine the Earth is a white dwarf star, which is about the same size as the Earth, and that Jupiter is where the Moon is, orbiting around Earth every 80 minutes."

These newly discovered stars are probably about 8 billion years old, as old as the Galaxy itself. Though as cool as brown dwarfs, and similar to them in size and mass, Howell emphasises that their structure and composition is likely to be different, and is not yet known.

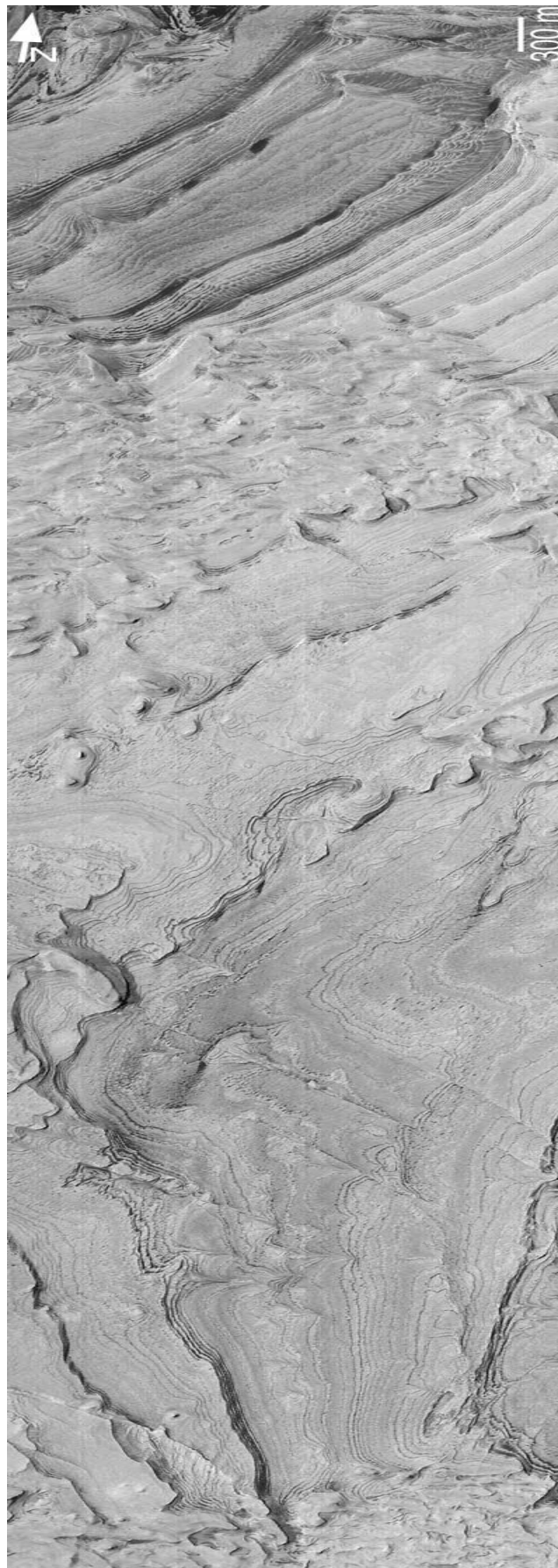
Spectacular layers of Mars exposed in Becquerel Crater

NASA/JPL/MSSS PHOTO RELEASE

Toward the end of its Primary Mapping Mission, Mars Global Surveyor's Mars Orbiter Camera (MOC) acquired one of its most spectacular pictures of layered sedimentary rock exposed within the ancient crater Becquerel. Pictures such as this one from January 25, 2001, underscore the fact that you never know from one day to the next what the next MOC images will uncover.

While the Primary Mission ended January 31, 2001, thousands of new pictures -- revealing as-yet-unseen terrain on the red planet -- may be obtained during the Extended Mission phase, scheduled to run through at least April 2002.

The picture shown here reveals hundreds of light-toned layers in the 167 kilometers- (104 miles-) wide basin named for 19th Century French physicist Antoine H. Becquerel (1852-1908). These layers are interpreted to be sedimentary rocks deposited in the crater at some time in the distant past. They have since been eroded and exposed, revealing faults, dark layers between the bright layers, and a long geologic history (of unknown duration) recorded in these materials. Sets of parallel faults can be seen cutting across the layers in the left third of the image.



Diary

**Feb 14th John Mason (South Downs AS) Building
the South of England Planetarium**

**Mar 14th Professor Andrew Liddle (University of
Sussex) 'Is the Universe Accelerating?'**

All monthly meetings (**bold**) are held at the Heene Church
Rooms, Heene Rd, Worthing @ 7:30pm

President: Mr. J L White FRAS

Executive Committee

Chairman: Brian Halls

7 Ryecroft Court
Penhill Road
Lancing
West Sussex, BN15 8HJ
Tel: 01903 521205
Email: brian_halls@hotmail.com

Vice-Chairman: Bob Turner

21 Beachwood Ave
Worthing
West Sussex
BN13 2HR
Tel: 01903 692522
Email: rfturner@compuserve.com

Secretary: Post Vacant

All Correspondence to The Chairman, Brian Halls at:

7 Ryecroft Court
Penhill Road
Lancing
West Sussex, BN15 8HJ
Tel: 01903 521205
Email: brian_halls@hotmail.com

Assistant Secretary: Kelvin Gale

65 Nutley Crescent
Goring by Sea
Worthing,
West Sussex
BN12 4LB
Tel: 01903 523769
Email: kelvan.gale@cwcom.net

Treasurer: Michael Marshall

84 Bramley Road,
Worthing,
West Sussex. BN14 9DT
Tel: 01903 823576

Curator of the Observatory: Graham Boots

101 Ardingly Drive,
Worthing,
West Sussex
BN12 4TW.
Tel: 01903 505346
Email: gboots@observatory99.freemove.co.uk
Web Site: www.observatory99.freemove.co.uk

Note to Contributors

Contributions to the **March** issue of WAS NEWS
should be with the Editor by **March 1st**. All material
for inclusion should be sent to the Editor.

Rob Davis

61 Stirling Court Road,
Burgess Hill
West Sussex
RH15 0PS
Tel: (01444) 239205
Email: robertdavis@lineone.net

a b c d e f g h i j k l m O n o p q r s t u v w x
y