

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

June 2003

“1+1=1: Stretching the Truth, Relatively?”

Paul Warren (Abingdon AS)

The Night Sky this Month

By Chris Holt

No eclipses or transits this month, I am afraid. There is the summer solstice, however, on June 19th. The Sun reaches its highest in the skies of the Northern Hemisphere, and we experience our longest period of daylight this year.

Amongst the planets, **Mercury** and **Venus** are caught in the glare of the Sun at present and so are not practical viewing objects.

Mars, about to leave Capricornus for Aquarius, rises in the early hours and is brightening but is still small compared with the angular size it will obtain at opposition in late summer.

Jupiter remains a late evening object, visible in the twilight sky once the Sun has set, setting just after midnight.

Saturn is not visible this month, as it is too close to the Sun in the sky, as it heads for solar conjunction on June 24th.

Uranus is in Aquarius, while **Neptune** appears near Mars in Capricornus. Both are thus early hours objects but are close to the horizon and will be challenging to observe.

There is an **occultation** of γ Librae, the brightest star (a double, mags. 2.8 and 5.2) in Libra by the Moon on Wed. 11th June. The star reappears from behind the bright limb of the gibbous Moon at about 23:35.

Moon Phases:

First Qtr: 7th June; Full: 14th June; Last Qtr: 21st June; New: 29th June; 1st Qtr: 7th July; Full: 13th July; Last Qtr: 21st July.

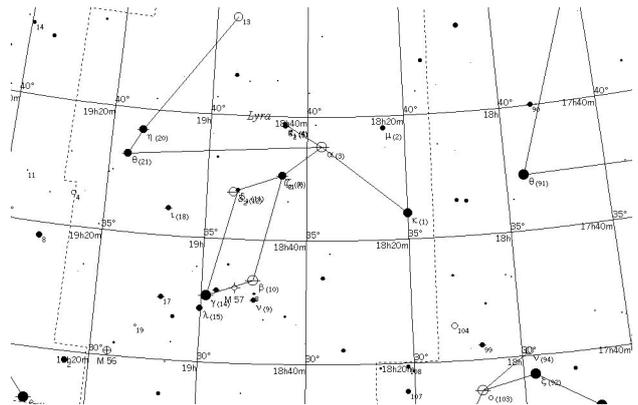
This month's Deep Sky Object

By Paul Warren & Paul M^cGale

This month's DSO is M57, more commonly known as the Ring Nebula, a bright planetary nebula situated in the constellation of Lyra.

With the light summer night-time skies, the Ring Nebula is bright enough to stand out in the summer night sky, even in small instruments.

Finding M57 is fairly straightforward. It lies not quite half way between beta and gamma Lyrae. Aim for that part of the sky, and if need be, sweep the area. Even at low powers, M57 appears non-stellar, with a greenish hue.



Once you have located M57, throw whatever magnification you can muster at it. It is bright enough to take magnification well. You should see a smoke ring. I normally see it being slightly green in colour, though others may see it as being blue. This is a good DSO to show to the ordinary layman – the smoke ring shape is not what they expect to see. To see the central star, you will need a large scope, 16 inches or greater and a dark sky observing site.

M57 is a planetary nebula, so what you are seeing is the outer layers of the star that have been blown away in the star's death throes. M57 lies at a distance of 1140 light years and the nebula is 0.4 light years wide. It is thought that the nebula was blown off the central star some 20000 years ago.

Whilst in this area of Lyra, you may like to see if you can observe the fluctuations in brightness of Beta Lyrae. This is an

eclipsing binary system, and it fluctuates between magnitudes 3.3 and 4.3 every 12.9 days.



The Prospect of Whitby - An Eclipse Report

By Paul Warren

Last Friday, I took my son Patrick (6 yrs old) with me up to Hawsker near Whitby for a camping weekend.

The campsite was on top of a cliff overlooking the sea to the east, so I pitched tent so as to get an unobstructed view of the horizon as possible. This gave me difficulties in setting up the tent, as the incoming breeze was also unobstructed. Putting the tent up was akin to flying a box kite!

It must be said that in retrospect this may have been a dangerous choice of location to set up the tent, as both father and son are known sleepwalkers! Especially so for the father as he once managed to fall out of a hotel bedroom window in his sleep and was lucky to survive a 30 feet fall with only half a dozen broken bones.

It's about a five hour drive from Nettlebed to Whitby, so I'd have loved a kip after getting the tent up. If only children would be so understanding! Instead I had to keep Patrick amused and I didn't get to bed myself until about 11.00 p.m.

Amazingly enough I woke up at 4.00 p.m. (sunrise was expected around 4.30), but the fool that I was, I managed to nod off to sleep again. I awoke again at 4.40, and scrambled out of the tent to see what the sky conditions were like.

I was greeted by a red letter 'C' (although it was a backward 'C') hanging low over the sea. It was very hazy on the low horizon, but this had the effect of rendering solar filters useless, and so I enjoyed the eclipse naked eye. I had got up just in time to catch the maximum eclipse cover. Talk about a lucky break!

I did try to wake up Patrick at this point, but he said "Oh good" and promptly rolled over and carried on sleeping.

I went back outside to enjoy more of the eclipse. As the moon uncovered more of the Sun, I could make out a couple of sunspots (still naked eye).

I then went back into the tent and succeeded in waking up Patrick and he saw some of the eclipse. I also set up the scope as the sun was brightening to the extent that a filter was going to be necessary.

As the sun brightened, so the reflection of the sun in the sea increased, from non-existent to a nice orange trail.

The colour of the sun started off from a deep crimson red to a bright orange hue.

After about half an hour of this I retired back to bed as I was in my pyjamas and it was on the chilly side and also I was doggone tired from Friday's driving and late night.

As I went back to bed (or sleeping bag rather), it occurred to me that I had witnessed a once in a lifetime event. The combination of a 'C' hanging just over the sea and with the glorious colours I had witnessed made for a very memorable event. Oh aye, the journey was well worth it. I rate this eclipse as better than the one back in 1999 (which was about 97% from where I saw it).



Eggs in the Air
by Patrick L. Barry

The sky will be filled with flying eggs on May 10, 2003, when a thousand students converge on The Plains, Virginia, for the first-ever national high school rocketry competition.

Called the Team America Rocketry Challenge (<http://www.rocketcontest.org>), the competition sets the goal of flying a custom-built, two-stage rocket carrying two raw eggs to a height of exactly 1,500 feet, and then returning the eggs to the ground unbroken. The team that comes closest to 1,500 feet without breaking their eggs will win the national title.

The competition is being organized by the Aerospace Industries Association and the National Association of Rocketry (NAR). NASA administrator Sean O'Keefe will attend the final event.

"The idea is to get kids interested in the world of aerospace," says Trip Barber, director of the competition and vice-president of the NAR. "And they will learn some important lessons about the power of math and science-and cooperation and teamwork-along the way."

To develop their designs, the students first used computer simulator software provided by NAR. Then they had to apply

old-fashioned ingenuity and craftsmanship to bring the design to life and flight testing to refine it.

Students constructed rocket bodies using a combination of hobby-store rocket kit parts and custom materials. A typical rocket might consist of cardboard tubes from paper-towel or wrapping-paper rolls, a pre-made nose cone, rocket-kit body segments cut to size, and light-weight, balsa wood fins. But the greatest challenge for many was designing the compartment for the eggs.



A Boeing Delta II (7326) rocket launched the New Millennium Program Deep Space 1 spacecraft on October 24, 1998.

Some used plastic Easter eggs as casings, padding the inside with bubble wrap, foam peanuts, or even gelatin. Others decided not to "reinvent the wheel," making a cradle from the egg-crate material used for shipping eggs. Some chose to make larger, more powerful rockets big enough to carry the eggs inside, while others made smaller, more efficient rockets that have a bulging egg compartment mounted on top.

A hundred unique designs will be put to the test in Virginia. Only one will win. But for the students, the real prize has already been won: Learning an approach to

problem-solving that works, whether you're launching eggs over a field or sending astronauts to Mars.

In the end, it's all about the future: Future technologies and the kids who will grow up to create them. Many advanced technologies are being developed now by NASA's New Millennium Program (<http://nmp.nasa.gov>). Who will do that work in the future? Perhaps some kids who spent their weekends launching eggs in the air.

Are you a kid? Would you like to build your own rocket? Visit NASA's Space Place and learn how to make a bubble-powered rocket! (<http://spaceplace.jpl.nasa.gov/rocket.htm>.) It won't take you to Mars, but it's a good way to get started.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Recent Environmental Changes Found on Mars

A year's worth of high-resolution infrared data gathered by the Thermal Emission Imaging System (THEMIS) on NASA's Mars Odyssey spacecraft reveals a dynamic planet that has experienced dramatic environmental change, in work which will soon be published in the journal *Science*.

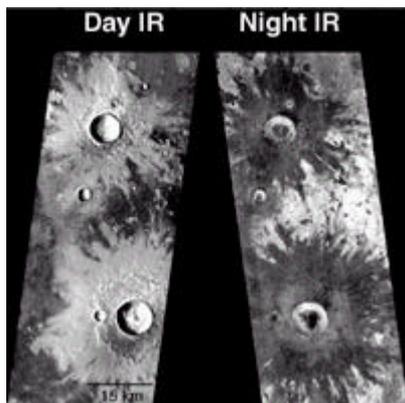
"THEMIS is creating a set of data that is going to revolutionize our mapping of the planet and our idea of the planet's geology," said lead author and THEMIS Principal Investigator Philip Christensen, Korrick Professor of Geological Sciences at Arizona State University. "It will keep Mars scientists busy for the next 20 years trying to understand the processes that have produced this landscape."

THEMIS provides detailed temperature and infrared radiation images of the Martian surface, revealing geological details that were previously impossible to detect. Key findings include the detection of layers in the Martian surface that indicate major changes in past environmental conditions.

"With a visible light camera, I can take a picture of a lava flow, but even with the highest resolution cameras that we have today the smallest thing we can see is the size of a bus and in order to do geology I need to have more detail," said Christensen.

"The camera on Mars Global Surveyor takes exquisite images that show layers, but it doesn't tell me anything about composition - is it a layer of boulders with a layer of sand on top? I have no way of knowing. With the THEMIS temperature data, I can actually get an idea because the layers vary - and each layer has remarkably different physical properties."

Daytime and night-time temperature data can allow scientists to distinguish between solid rock and a variety of loose materials, from boulders to sand and dust. Fine-grained sand heats up more rapidly at the surface than solid stone but also cools more rapidly at night, when solid materials retain heat.



(NASA image)

"We have seen layers, each with dramatically different physical properties, in places like Terra Meridiani," Christensen said. "Why do the physical properties in the different layers change? They change because the environment in which those rocks were deposited changed."

"It's very difficult to say exactly what happened in any particular place, but what we've found is that in many places on Mars it hasn't just been the same old thing happening for year after year for billions of years. These data have been so remarkable and so different from all of our previous experience that it has taken time to sift through the images and figure out what we're seeing."

Kilometre-wide stretches of bare bedrock have been found that were quite unexpected, given the Mars' known dustiness. These areas indicate that strong environmental forces are currently at work, "scouring" from the surface any past sediment as well as any new material that might be falling from the atmosphere.

Recent weathering processes are also indicated by the accumulations of loose rock commonly found on Martian hillsides. "If those rocks had been made a billion years ago, they'd be covered with dust," Christensen pointed out. "This shows a dynamic Mars - it's an active place."

Chocks away for Mars Express

Following the successful launch of Mars Express on June 2nd - witnessed on a large screen at RAL by six members of this Society - another 'high-risk' post-launch milestone was completed on June 5th.

Beagle-2's launch clamps had to be released, in a particularly delicate operation. Failure would have meant it would have been impossible to deploy the Mars Express lander, Beagle 2, on arrival at Mars.

These clamps are extra attachments that ensure the lander stays perfectly fixed to the spacecraft during the launch

and is not affected by launch vibrations. The clamps are not needed after the launch, as another mechanism keeps Beagle 2 in place during the six-month trip to the Red Planet. This is used to deploy Beagle 2 on arrival at Mars. But with the release clamps still in place, it would not have done so. "The Beagle-2 mission would have been over before it had even started!" in the words of ESA Lander Manager, Con McCarthy.

The release of the launch clamps started at 10.10 CEST and lasted about 30 minutes. Unlike the usual explosive launch clamps, Mars Express had a much gentler release mechanism for Beagle. A sleeve over a clamp bolt was heated by an electric current to about 100°C, causing it to expand and break the bolt. The three launch bolts were broken in sequence in this way.

"We had to wait two minutes for the expansion of the sleeve which snapped the bolt. The atmosphere in the room was tense and those two minutes seemed to last an eternity! When the first bolt went, a lot of tension was released," said Con McCarthy.

FURTHER DISCUSSION

The society's e-mailing list is used by members to comment on all things astronomical, as well as other related and not-so-related subjects. The list is also used to publicise "first-clear-night" observing evenings and for alerting members to hot observing news.

To subscribe: send an email to abiastro-subscribe@topica.com . You will then receive all e-mails sent to the list. To post e-mails on the list: send an email to abiastro@topica.com .To unsubscribe: send an email to abiastro-unsubscribe@topica.com

DATES FOR YOUR DIARY

30th August: Help out or visit the **Abingdon AS stall in Abingdon Market Place**. Occurring during National Astronomy Week, the theme will be observing Mars.

3rd September: 8pm. Help out or attend the **public Mars meeting and Mars observing session** (if clear) at **Sunningwell Village Hall**, Sunningwell near Abingdon.

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your help and contributions. Please send any news, observations, photos, etc. to:
Mail: A.T.Ramsey, 35 Cope Close, OXFORD, OX2 9AJ.
E-mail: AbiAstro@ATRamsey.com Phone: 01865 245339