

# SPACEWATCH

the newsletter of the Abingdon Astronomical Society

11<sup>th</sup> October 2004

Judit Brody– (author, science historian)

“History of Sunspots”

The nights are getting darker earlier now. Orion will soon be rising, and there have been lots of clear nights recently, so there's plenty of opportunity for observing. This month has the second lunar eclipse of this year. Unlike the last one you will have to stay up very late, or get up very early to see this one. It peaks at around 3am on the morning of the 28<sup>th</sup>. Sheer lunacy, one might say...

## THE NIGHT SKY THIS MONTH

by Bob Dryden

### The Planets:

#### Lunar Eclipse:

The highlight of this session is the total eclipse of the Moon on the night of October 27<sup>th</sup>/28<sup>th</sup>. All the action occurs in the early hours of 28<sup>th</sup> so you are going to have to get up very early to see anything (or stay up all night long!). The eclipse actually starts at 00.05 UT (01.05 BST) but you will be hard pushed to see any changes to the Moon's disc at that point. The umbral phase of the eclipse begins at 01.14 UT (02.14 BST) when you will notice the Earth's shadow start to encroach onto the lunar disc. Totality starts at 02.23 UT, mid totality is at 03.04 UT, and totality ends at 03.44 UT. The last traces of the umbral shadow leave the disc at 04.53 UT and the eclipse is affectively over. Technically, the eclipse goes on until 06.02 UT as the Moon move through the penumbral shadow but I doubt you will notice this part of the eclipse as the shadow is extremely subtle and hard to see. OK, the eclipse is at a very inconvenient time for most of us, but I urge you to at least make an effort to see at least part of the eclipse if it is clear because we are not going to get another one until 2006 (and the chances are that cloud could make us wait a lot longer than that). If nothing else, set your alarm clock for sometime during totality and just have a quick look out of the window - it really is well worth it.

**Venus:** Venus is still easily visible in the morning sky, high in the east. It is so bright it is difficult to miss. The planet is currently about 40 degrees from the Sun but it is now starting to fall back, and by months end its distance will have decreased to 34 degrees. This will continue to decrease with increasing rapidity so make the most of the scene over the next few weeks. Keep watch to the south of Venus because Jupiter is moving away from the Sun and

the two planets are approaching one another. Jupiter itself is an impressive -1.7 magnitude, and the pair are about half a degree apart on the morning of the 5<sup>th</sup> November. They will BOTH be in the same field of view of a low power eyepiece - something well worth seeing. After the 5<sup>th</sup>, Jupiter will be the higher of the two, and they will move apart quite quickly.

**Jupiter:** Apart from its meeting with Venus, Jupiter has a couple of other encounters with stars that are worth looking out for. On 17<sup>th</sup> October, the planet and its moons will be joined by a 6<sup>th</sup> magnitude star, 13 Virgo, and it will look as if Jupiter has gained a new moon for a day. The next morning, the 18<sup>th</sup>, a 4<sup>th</sup> magnitude star, eta Virgo, will be close to the planet.

**Saturn:** Gemini is home to the ringed planet this period with Castor and Pollux gaining a first magnitude companion as the three form a very rough line. Western quadrature occurs on 19<sup>th</sup>/20<sup>th</sup> October which means the shadow of the planets globe is cast furthest across the rings, as seen from Earth, so we get a nice 3D effect. Uranus and Neptune: This is your last chance this year to get to see either of these planets.

**Uranus** is in Aquarius and Neptune Capricorn, and both need binoculars to see them, but once you know where to look they are quite easy to see.

**Meteors:** There are two meteor showers this period worth looking out for. First, the Taurids, which are active throughout October and November. The maximum is on 3<sup>rd</sup> November but in reality the number you will see per hour is still low even then. What they do make up for though is that they are very often bright and long, so you notice them easily. Also, as the shower is active for so long you have plenty of opportunity to find a clear night. The second shower is the Orionids. Active from 16<sup>th</sup> to 27<sup>th</sup> October, with maximum on the 20<sup>th</sup>. This shower produces about 25 meteors an hour at maximum although many are faint so you will need a dark sky. Fortunately, on the night of maximum the Moon sets at about 10.30 BST so you have a dark sky for the rest of the night. Asteroids: The asteroid 4 Vesta is still easily visible in binoculars at about magnitude 6.5-7.0. Moving slowly in Aquarius, you need to look soon after dark to find it, low towards the south.

**Occultation:** If you fancy watching the Moon move in front of a brightish star (and you will be surprised how exciting that simple thing is) then point your telescope towards the Moon on the evening of 20<sup>th</sup> October. That night, at about 19.04 UT (20.04 BST), the magnitude 4.6 star, 59 Sagittarius, will disappear behind the dark part of the Moon.

**Comets:** There are two comets on view this period but you will need a telescope to see either of them. Comet

C/2001 Q4 NEAT is still with us. Now down to about magnitude 9.5/10, it is circumpolar (ie: above the horizon all night) moving through Ursa Minor and Draco, just below the bowl of Ursa Minor. Meanwhile, comet 78P/Gehrels is cruising along near the Taurus/Aries border. This one is a little fainter at magnitude 10.5/10.2.

### MOON PHASES:

Last Qtr: 6<sup>th</sup> Oct.; New: 14<sup>th</sup> Oct.; First Qtr: 20<sup>th</sup> Oct.; Full: 28<sup>th</sup> Oct.; Last Qtr: 5<sup>th</sup> Nov.

### OBSERVING SESSION

There was a large turnout at this month's observing session on Monday 4<sup>th</sup> October at our darkest observing site at Britwell Salome. Several large telescopes were brought along, as well as two pairs of binoculars fitted to tripods. If you haven't tried fitting your binoculars to a tripod you won't know the amazing difference this can make. Many pairs are fitted with a standard camera screw thread, and Celestron make an adaptor for £14 to fit any standard tripod mount. I got mine from David Hinds in Tring and can get one for you if you require. Just contact me on [AbAstro@ATRamsey.com](mailto:AbAstro@ATRamsey.com).

Objects observed included the Dumb-bell Nebula in Vulpecula, and the Veil Nebula in Cygnus – a fine sight through either Paul W's O3 filter or Inayat's UHC filter. Later the Moon rose, as did the Pleiades, making fine binocular objects.

If you haven't been to an observing evening yet, why not come along to the next one. It's right in the centre of Abingdon, making it the most accessible of our three sites. It's on the first clear night (FCN) of 1<sup>st</sup> to 3<sup>rd</sup> November, and, clouds (and fireworks)-permitting, we shall be observing on Abbey Meadow, by the open air swimming pool. Park in the Abbey Car Park (free at night).

### THIS MONTH'S DEEP SKY OBJECTS

#### “World's Apart”

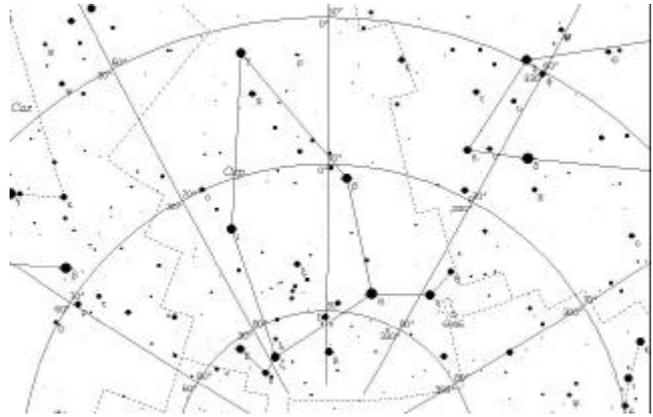
by Paul Warren

This month we'll be looking at two very different kinds of star clusters, which differ enormously in both size and distance.

The objects are known as NGC 6939 and NGC 6946, and they are to be found in the constellation Cepheus, which is well placed for evening observing.

When I described these two objects as both being star clusters, I was stretching the truth a little. NGC 6939 is indeed an open cluster, a member of our Milky Way galaxy. NGC 6949 on the other hand is a galaxy, some 18 million light years away.

These two objects lie very close to one another, so I've only shown one of them in the finder chart, otherwise their labels would overlap. Start off from alpha Cep, and hop over to eta Cep. The cluster and galaxy are only a short hop away from here. I must point out that you can end up breaking your neck whilst using the finder scope on Cepheus at this time of year, as the constellation is directly overhead.



To be honest, neither of these two objects is spectacular in its own right. However, I do like the view of seeing both of these objects in the same field of view. Two clusters of stars, their sizes and distances being orders of magnitude different – worlds apart indeed!

The open cluster resolves quite nicely in my 8 inch scope, though it's not a bright cluster. An 8 inch scope can reveal about 60 stars in this cluster, scattered in an irregular shape.

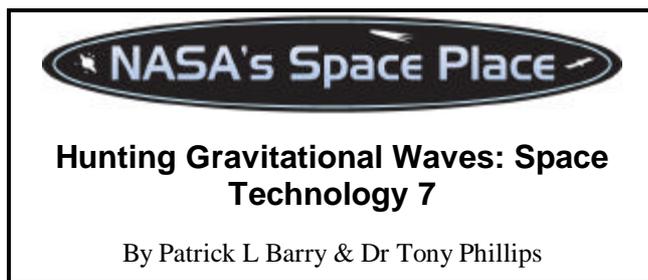
The galaxy does seem to require good seeing conditions. There have been times when it barely shows at all. Although its magnitude is listed at 8.8, it has a very low surface area brightness, thus making it more difficult to see than it should be.



This galaxy is extraordinarily productive in supernovae. Eight supernovae have been seen in this galaxy over the last 100 years, and there is a recent one at the moment. This latest supernova is visible in my 8 inch scope (the supernova is about magnitude 12.5), but you will need a detailed star chart to be able to positively identify it. One such chart can be found at the following URL:

<http://www.aavso.org/cgi-bin/searchcharts3.pl?name=ngc%206946>

I also recommend using medium to high magnification for this sort of activity, as increasing the magnification increases the contrast, thus making it easier to pick out the fainter stars.



Among the mind-blowing implications of Einstein's general theory of relativity, direct verification is still missing for at least one: gravitational waves. When massive objects like black holes move, they ought to create distortions in space-time, and these distortions should spread and propagate as waves--waves in the fabric of space-time itself.

If these waves do exist, they would offer astronomers a penetrating view of events such as the birth of the Universe and the spiraling collisions of giant black holes. The trick is building a gravitational wave detector, and that's not easy.

Ironically, the gravitational waves spawned by these exceedingly violent events are vanishingly feeble. Gravitational waves exert a varying tug on objects, but this tug is so weak that detecting it requires a device of extraordinary sensitivity and a way to shield that device from all other disturbances.

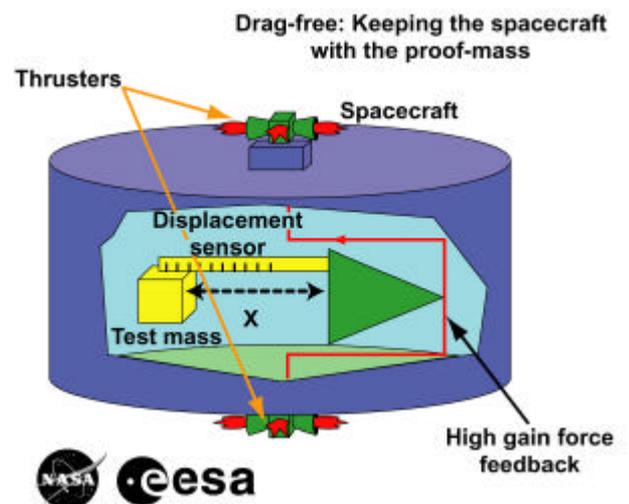
Enter Space Technology 7 (ST-7). This mission, a partnership between NASA's New Millennium Program and the European Space Agency (ESA), will place a satellite into a special orbit around the Sun where the pull of the Earth's and Sun's gravities balance. But even the minute outside forces that remain -- such as pressure from sunlight -- could interfere with a search for gravitational waves.

To make the satellite virtually disturbance-free, ST-7 will test an experimental technology that counteracts outside forces. This system, called the Disturbance Reduction System (DRS), is so exquisitely sensitive that it can maintain the satellite's path within about a nanometer (millionth of a millimeter) of an undisturbed elliptical orbit.

DRS works by letting two small (4 cm) cubes float freely in the belly of the satellite. The satellite itself shields the

cubes from outside forces, so the cubes will naturally follow an undisturbed orbit. The satellite can then adjust its own flight path to match that of the cubes using high-precision ion thrusters. Making the masses cube-shaped lets DRS sense deviations in all 6 directions (3 linear, 3 angular).

ST-7 is scheduled to fly in 2008, but it's a test mission; it won't search for gravitational waves. That final goal will be achieved by the NASA/ESA LISA mission (Laser Interferometer Space Antenna), which is expected to launch in 2011. LISA will use the DRS technology tested by ST-7 to create the ultra-stable satellite platforms it needs to successfully detect gravitational waves.



*Space Technology 7 will test a technology to be used in detecting gravitational waves in space.*

If ST-7 and LISA succeed, they'll confirm Einstein (again) and delight astronomers with a new tool for exploring the Universe.

Read more about ST-7 at <http://nmp.jpl.nasa.gov/st7> . For kids in a classroom setting, check out the "Dampen that Drift!" article at [http://spaceplace.nasa.gov/en/educators/teachers\\_page2.shtml](http://spaceplace.nasa.gov/en/educators/teachers_page2.shtml) .

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

## 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 view the messages on the web go to: <http://www.smartgroups.com/groups/abastro> .

To subscribe to the list either go to this web page and click on "Join the Group" or send an email to [abastro-subscribe@smartgroups.com](mailto:abastro-subscribe@smartgroups.com) . You will then receive all e-mails sent to the list. To post e-mails on the list: send an

email to [abastro@smartgroups.com](mailto:abastro@smartgroups.com) . To unsubscribe: send an email to [abastro-unsubscribe@smartgroups.com](mailto:abastro-unsubscribe@smartgroups.com)

Don't forget the Society's web site:

[www.abingdonastro.org.uk](http://www.abingdonastro.org.uk)

Our webmaster, Chris Warwick is always on the look-out for members' photographs to put on there. Don't forget you can read back copies of SpaceWatch on the web site too.

### DATES FOR YOUR DIARY

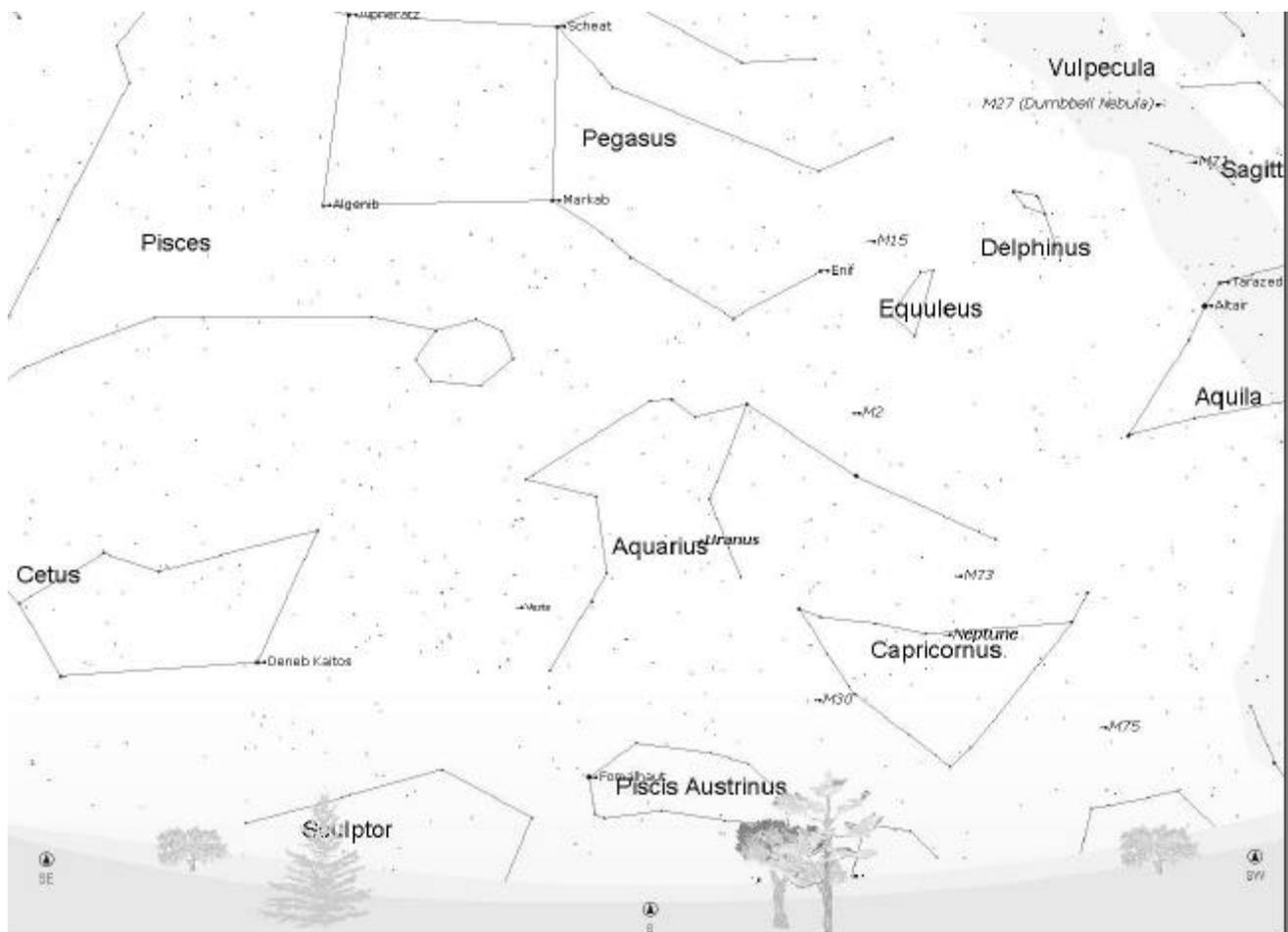
**18<sup>th</sup> Oct.:** 8pm. Beginners' Meeting in the Perry Room.

**1<sup>st</sup>-3<sup>rd</sup> Nov. (FCN\*):** 8pm Observing Evening at Abbey Meadow, Abingdon. [FCN = 'first clear night' – ring Bob to confirm before setting out.

**8<sup>th</sup> Nov.:** 8pm. Stan Cocking Memorial Lecture: Dr Allan Chapman, Wadham College, Oxford, "Lord Rosse: the Astronomer of the Spirals".

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: [AbAstro@ATRamsey.com](mailto:AbAstro@ATRamsey.com) Phone: 01865 245339

### STAR CHART



This is the view you will see if you look south at 10pm next Saturday (16<sup>th</sup> October).

If you have a pair of binoculars or a small telescope, why not try to look for the planets Uranus and Neptune, or even the minor planet Vesta (lower left). If you look from night to night, you will see all three planets move against the backdrop of the "fixed" stars.