

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

8th October 2007

Dr Andrew Norton
– Open University:
"Exoplanets and how to find them"

Hello everyone. A couple of substitutes take to the field this month: I'm sitting in the editor's chair for Andrew and Julian will be organising this month's observing evening at Abbey Meadow in Abingdon. Phone Julian on 01235 531507 by about 7 pm on the first clear night 15th – 17th October.

There are also a couple of programme changes to forthcoming meetings. Our new speaker for the November main meeting will be Gordon Rogers, a well known astrophotographer from Long Crendon. For the December main meeting our speaker will be Nik Szymanek, one of the UK's leading CCD imagers who now observes mainly from La Palma.

Chris Holt

THE NIGHT SKY THIS MONTH

by **Bob Dryden**

Moon – When you look at the Full Moon on 26th October, does it look larger than usual? On that day, the Moon's elliptical orbit brings it the closest it is going to be this year to the Earth. Conversely, on 9th November it is the furthest from Earth for 2007 but it will be difficult to see this as the Moon will be New and close to the Sun.

Mercury – Inferior conjunction with the Sun occurs on 23rd October following a very poor evening apparition. Mercury quickly moves in to the morning sky and reaches its Greatest Western Elongation of 19 degrees on 8th November. On that date, Mercury will be about 15 degrees high in Virgo at sunrise, which is about 07.00 BST, with the bright star Spica just to the right of the planet and the thin crescent Moon below both of them.

Venus - Now firmly established in the morning sky, the -4.3 mag Venus is difficult to miss as it crosses Leo and Virgo. Greatest Western Elongation of 46 degrees is on 28th October and Venus will be about 35 degrees high at sunrise. Theoretically, the phase reaches 50% at elongation, but Venus usually breaks this rule. What date do you think the planet reaches half phase?

From 9th to 13th October we have a pretty gathering of Venus, Saturn, and Regulus. Between these dates all three will be inside a 5 degree circle.

Mars – Mars is rising earlier and earlier now as it crosses Gemini. In mid October it rises about 22.00 BST but by mid November that time becomes 19.30 BST. It is brightening nicely as well, improving to -0.8 mag by mid November. We will just have to hope that the global dust storm dissipates otherwise we are not going to see much detail on the planets disc.

Jupiter – Unfortunately Jupiter is now too close to the Sun to observe.

Saturn – As already mentioned, Saturn is in the morning sky in Leo. The rings are quite closed up now at -7 degrees, and the planet is still low at sunrise so the views are not going to be too good at the moment.

Uranus + Neptune – This is the best time of the year to see these two planets in the evening sky. Both can be seen in binoculars, Uranus at +5.7 mag in Aquarius and Neptune +7.8 in Capricornus.

Occultations – On 22nd October at 18.38 UT the bright star Lambda Aquarius (+3.8 mag) disappears behind the dark lunar limb. The Moon will be about 17 degrees high in the south east and any small telescope will show you the event.

We have yet another lunar occultation of the Pleiades on the evening of 27th/28th October. On the down side though, the Moon is just a day or so past Full so the sky is going to be bright. However, a telescope should show the brighter occultation events, with the brightest ones being mag +3.8 at 23.04 UT and mag +4.0 at 00.04 UT. There will be several slightly fainter occultations of the cluster over this period so it is well worth having a look if you have a scope. The Moon will be about 50 degrees high in the south east at the time.

Meteors - Between 16th and 27th October the Orionid meteor shower will be active. Maximum is on 20th October when you may see up to 25 meteors an hour just before dawn. The shower is quite favourable this year for maximum as the Moon sets about midnight. These meteors are debris from Comet Halley and tend to be swift and faint.

Also active will be the Taurids. They can be seen between 20th October and 30th November. While the maximum is on 3rd November, you usually only see a small handful per hour, but what they lack in numbers they can make up for in brightness. They are often very bright and long so while out stargazing during this session keep your eyes out for them.

Asteroids - While not strictly an asteroid anymore as it has been reclassified as a dwarf planet, 1 Ceres is brightening steadily from +7.7 to +7.2 this session as it crosses Cetus. All you will need is a pair of binoculars and a finder chart to track it down.

LAST MEETING'S TALK

by Gwyneth Hueter

If you missed Martin Lunn's talk on the discovery of Pluto, you will eventually be inundated with facts about Pluto when the spacecraft New Horizons gets there. (In 2015, so don't get too excited.)

Mr Lunn is the Curator of Astronomy at the Yorkshire Museum and owns the astronomical book company Aurora Books. (He brought a good selection with him for us to peruse.) He gave us the background to Pluto's discovery with the surprise discovery of Uranus in 1781. Then, when Uranus didn't follow its expected path (some unknown object's gravity was affecting its orbit) an eighth planet was proposed and eventually located in 1846 after a series of mishaps. But then Neptune also wandered off its expected path...

Most of us will already have heard all this, as we have heard of the story of Percival Lowell and the setting up of the Flagstaff Observatory in Arizona so that he could hunt for evidence of life on Mars and this supposed ninth planet. But, as always, there are new slants to the telling of the tale. In this case, Mr Lunn told of how the observatory was due to be sold in 1916 but Lowell's brother saved it.

Pluto was eventually discovered by Clyde Tombaugh in March of 1930, using plates taken in January 1930.

In 1979 James Christy of the US Naval Observatory was checking plates of Pluto and discovered Pluto's satellite Charon. We were treated to the background on the name, which was based on the name of Christy's wife Charlene. It sounds as though Christy was a workaholic whose work got in the way of a house move. What a way to make amends!

No talk on Pluto can end without reminding us about the long debate on its status as a planet or asteroid. We now have to accept that it is a dwarf planet, one of the largest members of the Kuiper belt of planetary bodies in an orbit beyond Neptune. In the last ten years we have additions such as Sedna, Quaoar, and Eris which is larger than Pluto and was discovered in 2003. It was temporarily named Xena. Mr Lunn elicited quite a laugh from the audience when he told us Eris is named after the Greek goddess who causes confusion.

At the moment, Pluto ranks among these other bodies, including Ceres, as a dwarf planet. (I'd like to add that Ceres, Pluto and Eris are included in the planetary ephemerides in the magazine Astronomy Now, but that they're listed together after the main planets.)

Comets - Comet C/2007 F1 LONEOS continues to brighten as it approaches perihelion. It is crossing Coma Berenices at the moment at about 8th magnitude. It moves into Bootes and glides just below Arcturus around the 20th October when hopefully it will be around fifth magnitude. It begins to move more rapidly after this, quickly crossing into Libra and then Scorpius by November when it is lost.

The brightness a comet reaches is not easy to predict and it could well be brighter than 5th mag, but equally, it could be fainter than predicted, so get out there and have a look before the bright Moon returns to the evening sky in the second half of October.

MOON PHASES:

Last Qtr: 3rd Oct.; New: 11th Oct.; 1st Qtr: 19th Oct.; Full: 26th Oct.; Last Qtr: 3rd Nov.; New: 9th Nov.

CARANCAS – SOMETHING IN THE AIR

At 16:45 UT (11:45 local time) on 15th September what is believed to be a meteorite impact event occurred near Carancas in the Chucuito province of Peru, close to the border with Bolivia (16°39' 52"S, 69°02'38"W). An elliptical crater of area 13.3 m by 13.8 m and an estimated depth of 5 to 10 m resulted and rapidly filled with ground water, which then boiled for ten minutes. Prior to the impact a bright white fireball had been seen. A loud explosion was heard in Desaguadero, 20 km from the impact site and a window of the health centre at Carancas is reported to have broken during earthquake-like tremors. Smoke and a sulphurous smell were reported in the vicinity of the impact site.

Carancas is situated on a high plateau (3824 m above sea level) and the local soil is reddish brown in colour. The impact crater, which has an ejecta rim one metre higher than the adjacent soil on the north side, has a grey surface covering from the meteorite material. By the time a scientist, Luisa Macedo, from the Instituto Geológico Minero y Metalúrgico arrived 36 hours later, most of the larger pieces of the meteorite had been removed by villagers. She reported that fragments were of "fine grained, light grey, fragile rocky material" with iron inclusions of 1mm diameter. Subsequent microscopic investigations showed a composition of chondritic texture, and a mineral composition including pyroxene, olivine, iron, kamacite, troilite, and feldspar. Kamacite is known only to occur in meteorites. Further investigations were being carried out.

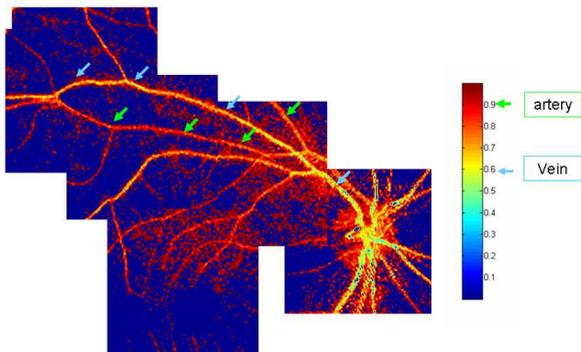
Initial reports that about 200 people suffered from headaches, nausea and vomiting following the impact are now regarded as exaggerated. Some 30 people are now believed to have been ill, although the cause is not known. As the local groundwater contains arsenic compounds, it has been suggested that the illness resulted from inhalation of arsenic bearing water vapour.



A MISSILE IN YOUR EYE

by Patrick L. Barry

Satellite technology designed to catch ballistic missile launches may soon help doctors monitor the health of people's eyes. For the last 15 years, Greg Bearman and his colleagues at JPL have been working on a novel design for a spectrometer, a special kind of camera often used on satellites and spacecraft. Rather than snapping a simple picture, spectrometers measure the spectrum of wavelengths in the light coming from a scene. From that information, scientists can learn things about the physical properties of objects in the photo, be they stars or distant planets or vegetation on Earth's surface. In this case, however, the challenge was to capture snapshots of short-lived events—like missile launches! The team of JPL scientists designed the new spectrometer, called a computed tomographic imaging spectrometer (CTIS), in collaboration with the Ballistic Missile Defense Organization as a way to detect missiles by the spectral signatures of their exhaust.



This three-color composite image from the computed tomographic imaging spectrometer shows the oxygenation of the blood in the arteries and veins of a human retina. (Arteries appear red, veins appear yellow.)

But now the scientists are pointing CTIS at another fast-moving scene: the retina of an eye. Blood flowing through the retina has a different spectral signature when it is rich in oxygen than when it is oxygen deprived. So eye doctors can use a spectrometer to look for low oxygen in the retina—an indicator of disease. However, because the eye is constantly moving, images produced by

conventional spectrometers would have motion blurring that is difficult to correct. The spectrometer that Bearman helped to develop is different: It can capture the whole retina and its spectral information in a single snapshot as quick as 3 milliseconds. "We needed something fast," says Bearman, and this spectrometer is "missile-quick."

CTIS is even relatively cheap to build, consisting of standard camera lenses and a custom, etched, transparent sheet called a grating. "With the exception of the grating, we bought everything on Amazon," he says. The grating was custom-designed at JPL. It has a pattern of microscopic steps on its surface that split incoming light into 25 separate images arranged in a 5 by 5 grid. The center image in the grid shows the scene undistorted, but colors in the surrounding images are slightly "smeared" apart, as if the light had passed through a prism. This separation of colors reveals the light's spectrum for each pixel in the image.

"We're conducting clinical trials now," says Bearman. If all goes well, anti-missile technology may soon be catching eye problems before they have a chance to get off the ground.

Information about other NASA-developed technologies with spin-off applications can be found at <http://www.sti.nasa.gov/tto>.

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

DATES FOR YOUR DIARY

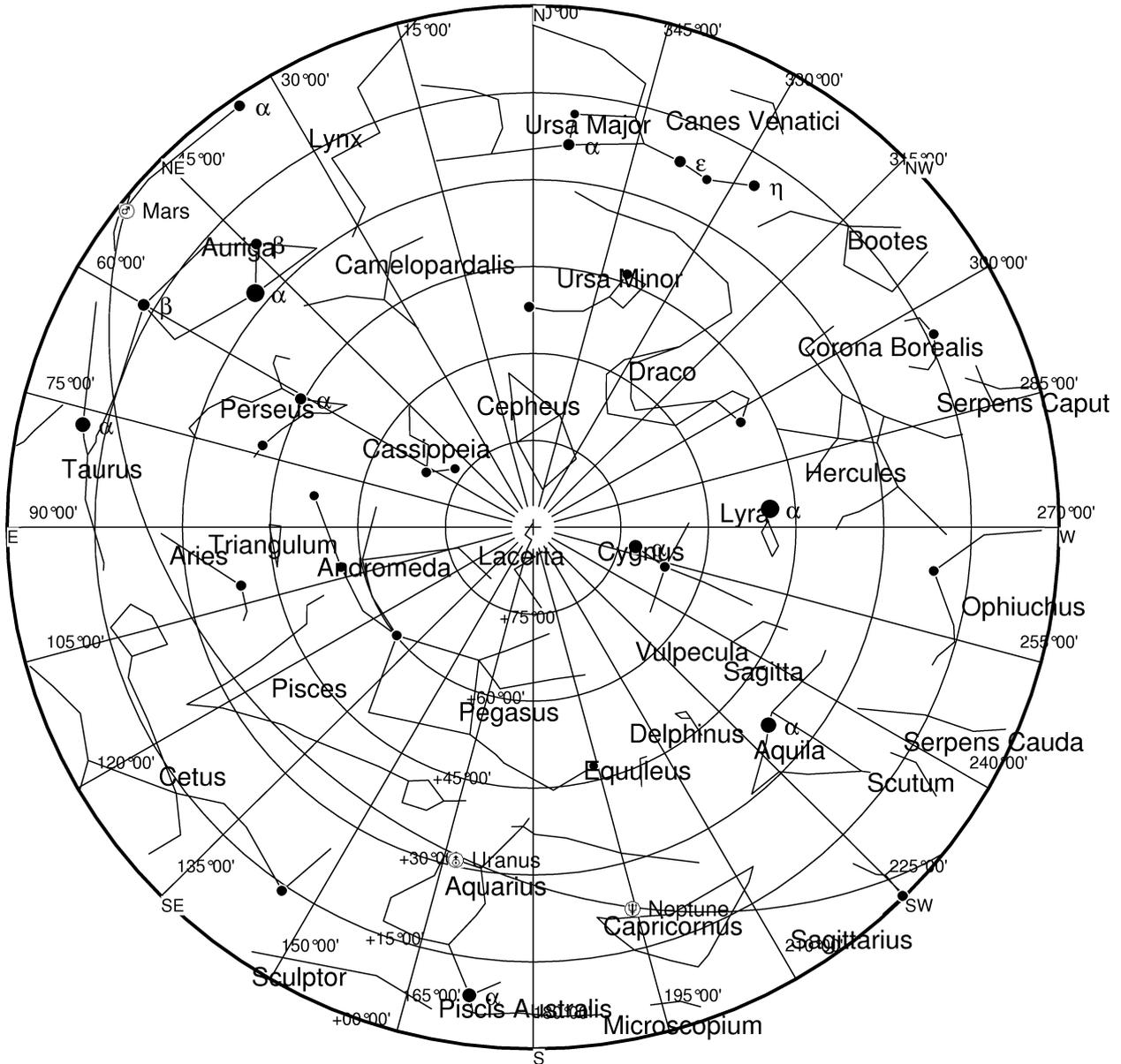
15th – 17th Oct. (First clear night) Observing Evening at Abbey Meadow. Phone Julian on 01235 531507 for details

22nd Oct. 8pm. Beginners' Meeting in the Perry Room.

12th Nov. 8pm Speaker meeting: Gordon Rogers 'Imaging Deep Space from Long Crendon'. *This is a change to the published programme.*

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

STAR CHART



The Night Sky at 10pm (BST) next Saturday (13th October)

The Summer Triangle of Altair, Deneb and Vega is now in the western sky. The Great Square of Pegasus is high in the south-south-east. Twinkling over the southern horizon is Fomalhaut in Piscis Australis. This 1.16 magnitude star is the most southerly first magnitude star to be visible from England. Over in the east, Capella, Aldebaran and the Pleiades are rising. On Saturday 13 October the Moon is a 7% visible waxing crescent that sets in the early evening. Later on, why not count how many stars you can see unaided in the Great Square of Pegasus. The four corner stars are all 2nd magnitude, so if these are all you see you must be looking from a light polluted sight. Under ideal conditions it is possible to see a dozen or more stars. From Abingdon, seeing the five stars of 5th magnitude and brighter is probably a more realistic challenge. Tom Trusock, in an article about Pegasus (http://www.cloudynights.com/item.php?item_id=439), lists the numbers of stars visible in the Great Square for various naked eye limiting magnitudes. A subset of his table is:

limiting magnitude	no. stars visible
4	0
4.5	1
5	4
5.5	7