SPACEWATCH

the newsletter of the Abingdon Astronomical Society

10th November 2008

James Fradgley
(Wessex Astronomical Society) –

'Life in the Universe'

Now that the clocks have gone back, it is dark almost as soon as you get home from work, so get out there early and observe before it gets too cold. Uranus and Neptune are getting near the Sun, but if you're out early you will see both Jupiter and Venus. You will have to stay up very late, or get up early to see Saturn, which is not showing its rings at the moment as they are edge on as seen from the Earth.

THE NIGHT SKY THIS MONTH

by Bob Dryden

Venus: At magnitude -4.0 it is hard to miss Venus now as it shines low in the south-west after sunset. If you have a telescope, you can watch the phase decrease throughout the session, reaching 0.66% by mid December. December 1st should be ringed on your calendar because at 15.47UT Venus is occulted by the Moon! Obviously, this is in daylight and the Moon will be a thin crescent so you may need a pair of binoculars to find them. You will need to look towards the south, about 13° above the horizon. Venus will reappear at 17.17UT. When you know exactly where to look, see if you can see Venus with your naked eye. Also, see if you can see Jupiter in the binoculars. It will be just above and right of the Moon. After sunset, they will present a lovely sight against the twilight sky.

Jupiter: The other bright planet in the evening sky is Jupiter. Jupiter and Venus are getting closer together in the sky until December 1st when they are at their closest.

On the evening of November 30th Jupiter, Venus and the Moon present a nice grouping after sunset, although they will not be as close together as the following night (see above).

Uranus + Neptune: Both are still visible in binoculars in the evening sky but viewing time is running out as they are approaching the Sun. [Ed. … as seen from the Earth, don't worry – the solar system isn't collapsing!]

Saturn: On view in the morning sky, Saturn is still in Leo, rising by about midnight in December. It is not hard to find at +1.1 mag. but you will not see the famous rings at the moment. Their angle is a very shallow 1° so they appear as just an extremely thin line which is virtually invisible except in very large telescopes. However, you may be able to watch the satellite events. There are two possible events you can see in a decent telescope if you have a clear eastern horizon. At 02.15UT November 13th Titan reappears from behind the planets limb but Saturn will be very low down at the time. A slightly better chance to see the same thing occurs on 29th November at 02.22UT when Saturn will be higher at 16° above the horizon.

Occultations: Apart from the Venus occultation mentioned above, you have the chance to watch the Moon occult the Pleiades on 13th November, between approximately 1905 and 20.48UT. The brightest event is at 19.32UT when third magnitude Alcyone (eta Taurus) is occulted, and it reappears at 20.10UT. Unfortunately, the Moon is Full so many of the fainter stars will be hard to see. December 6th sees Lambda Pisces (4.6 mag) occulted at 21.44UT. The Moon will be at first quarter, high in the west at the time, and any small telescope should enable you to see the event.

Meteors: The Taurids are still active until November 30th although the Moon will interfere with viewing. However, as some of the Taurid meteors will be bright, they should still be easily visible. The other active shower this session is the Leonids. Active between 15th and 20th November, the maximum is on the 17th at 12.00UT. The high meteor rates a few years ago have now gone, and the hourly rate is now down to a mere 20 per hour. Sadly, the Moon is 19 days old on the 17th and rises at 20.30UT so observations will be rather difficult.

Comets: Comet 2006 OF2 (Broughton) is still visible in Lynx (close to the Auriga/Camelopardus borders). Around magnitude 10.8, you will need a telescope to find this one. The other comet predicted to be around is 85P/Boethin which should be moving from Capricornus into Aquarius, brightening from 8.3 to 7.5 magnitude. However, no-one has found this comet yet. It should have been found by now, but it hasn't. It now looks like the comet has disintegrated and is therefore dead and gone.

Asteroids: There are still two bright asteroids for you to track down. 1 Ceres is crossing Leo and brightens from 8.6 to 8.2 magnitude, although it will not be at it brightest until February. Meanwhile, 4 Vesta is fading slightly to 7.2 mag and it moves from Cetus into Pisces. Both are easily seen in binoculars if you have a decent finder chart.

MOON PHASES:

Full: 13th Nov.; Last Qtr: 19th Nov.; New: 27th Nov.; 1st Qtr: 5th Dec.

Photos by Julian Mole:

THE CHEMICAL WEATHER REPORT

"Sunny tomorrow with highs in the mid-70s. There's going to be some carbon monoxide blowing in from forest fires, and all that sunshine is predicted to bring a surge in ground-level ozone by afternoon. Old and young people and anyone with lung conditions are advised to stay indoors between 3 and 5 p.m."

Whoever heard of a weather report like that?

Get used to it. Weather reports of the future are going to tell you a lot more about the atmosphere than just how warm and rainy it is. In the same way that satellite observations of Earth revolutionized basic weather forecasting in the 1970s and 80s, satellite tracking of air pollution is about to revolutionize the forecasting of air quality. Such forecasts could help people plan around high levels of ground-level ozone—a dangerous lung irritant—just as they now plan around bad storms.

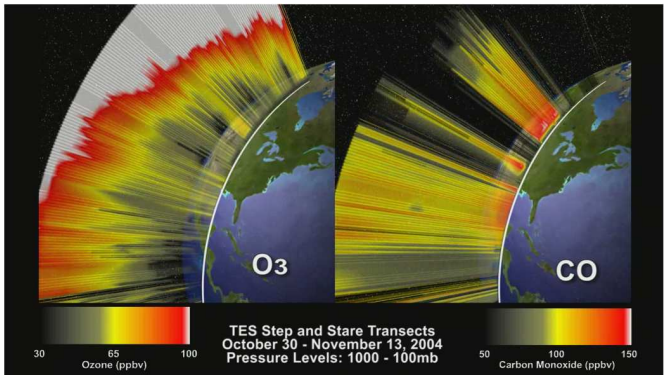
"The phrase that people have used is chemical weather forecasting," says Kevin Bowman of NASA's Jet Propulsion Laboratory. Bowman is a senior member of the technical staff for the Tropospheric Emission Spectrometer, one of four scientific sensors on NASA's Aura satellite.

Aura and other NASA satellites track pollution in the same way that astronomers know the chemical composition of stars and distant planetary atmospheres: using spectrometry. By breaking the light from a planet or star into its spectrum of colors, scientists can read off the atmosphere's gases by looking at the "fingerprint" of wavelengths absorbed or emitted by those chemicals. From Earth orbit, pollution-watching satellites use this trick to measure trace gases such as carbon monoxide, nitrogen oxide, and ozone.

However, as Bowman explains, "Polar sun-synchronous satellites such as Aura are limited at best to two overpasses per day." A recent report by the National Research Council recommends putting a pollution-watching satellite into geosynchronous orbit—a special very high-altitude orbit above the equator in which satellites make only one orbit per day, thus seeming to hover over the same spot on the equator below. There, this new satellite, called GEOCAPE (Geostationary Coastal and Air Pollution Events), would give scientists a continuous eye in the sky, allowing them to predict daily pollution levels just as meteorologists predict storms.

"NASA is beginning to investigate what it would take to build an instrument like this," Bowman says. Such a chemical weather satellite could be in orbit as soon as 2013, according to the NRC report. Weather forecasts might never be the same.

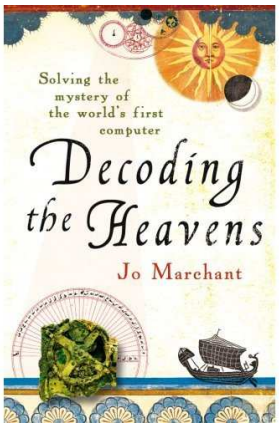
Learn more about the Tropospheric Emission Spectrometer at tes.jpl.nasa.gov.
Kids can learn some elementary smog chemistry while making "Gummy Greenhouse Gases" out of gumdrops at spaceplace.nasa.gov/en/kids/tes/gumdrops.



Example of visualization of data from the Tropospheric Emission Spectrometer. These frames are from an animation that steps through transects of the atmosphere profiling vertical ozone and carbon monoxide concentrations, combining all tracks of the Aura satellite during a given two week period.

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

NEW ANTIKYTHERA BOOK



A new book has just been published by Heinemann telling the fascinating story of the Antikythera Mechanism – the world's oldest computer built in the 2nd century B.C. – a bronze geared mechanism which predicted the phases of the Moon, the positions in the sky of the Sun, the Moon and possibly the planets, and even the times of solar and lunar eclipses. The book tells how the latest technology, X-ray computed tomography, revealed the secrets of the earliest technology in this lump of now corroded bronze which lay at the bottom of the Mediterranean Sea for over 2000 years until its discovery by sponge divers in 1901.

It is a gripping Indiana-Jones style adventure featuring Archimedes, Hipparchus, eccentric English gentlemen and an international 21st century collaboration between academics of many disciplines to finally decode this mysterious artefact.

Written by Jo Marchant.
Published by William Heinemann, London, 2008 Price £12.99.
ISBN 978-0-434-01835-2.

LAST MEETING'S TALK

by Gwyneth Hueter

Last month's talk was intriguingly called 'Isaac Newton and the Surrey Pumas', given by Mike Frost, and it was a bit of a mixture of his thoughts on the odd theories that people have come up with in order to explain unexplained phenomena.

He talked about a man from the last century called Brinsley Le Poer Trench, who had many mad ideas including that the Earth was hollow and that these Surrey pumas and other mystery animals were in fact aliens who were coming up from below. Where from? From the holes in the poles of course. After all he had satellite shots of the holes as evidence – and that those flying saucers we keep seeing are coming out of the poles.

Even Edmond Halley considered that the Earth could be hollow and that the holes in the poles would explain were the aurorae were coming from…. It would explain why the Earth's mass seemed too low for its size.

Sir Patrick Moore let these oddball theorists speak for themselves in his book 'Can you speak Venusian' (Star Publications, 1972).

The second part of Mike's talk was about the effects of gravity on planetary bodies. Using Newton, he showed that the pull of gravity would not work inside a hollow Earth. (He didn't say how rotation comes into the equation.) Newton couldn't explain the oddities in Mercury's orbit; that was when people began looking for another planet between Mercury and the Sun. They even called it Vulcan, but it didn't exist, and eventually Einstein was able to explain away Mercury's odd orbit.

Mike finished off by describing how asteroidal bodies can orbit each other and the odd gravitational choreographics exhibited by Saturn's satellites Janus and Epimethius whose orbits are so close that they keep swapping places every time the inner one catches up with the outer one. Then he showed some asteroids performing gymnastics: three in a group bound by gravity and then in the various Lagrangian points around a planet orbiting a star.

FURTHER DISCUSSION

If you are not already on our internet mailing list, then why not log on to YahooGroups. The list is called 'abingdonas'. Members use the list to alert each other about celestial events and to chat about amateur astronomy. The list is quite active, with several messages most weeks. To read through previous messages click on http://groups.yahoo.com/group/abingdonas/ .

To join the abastro list, please go to http://www.yahoogroups.com . You can also unsubscribe from the list here. To post messages to the list, please send them to abingdonas@yahoogroups.com . Please note that you will need to sign up with a YahooID if you do not already have one. You can do this on the above page.

Further information about the mailing list can be found on the abingdonas webpage at : http://groups.yahoo.com/group/abingdonas/ .

Further discussion on astronomy and many other topics takes place at the Spread Eagle pub in Northcourt Road after the meeting. You are most welcome to join us.

DATES FOR YOUR DIARY

17th Nov. 8pm. Beginners' Meeting in the Perry Room.

24th – 26th Nov. (First clear night) - 8pm. Observing evening at Frilford Heath.

8th Dec. 8pm Speaker meeting: Stan Cocking Memorial Lecture: Prof. James Binney (Oxford University), 'The Milky Way'.

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:
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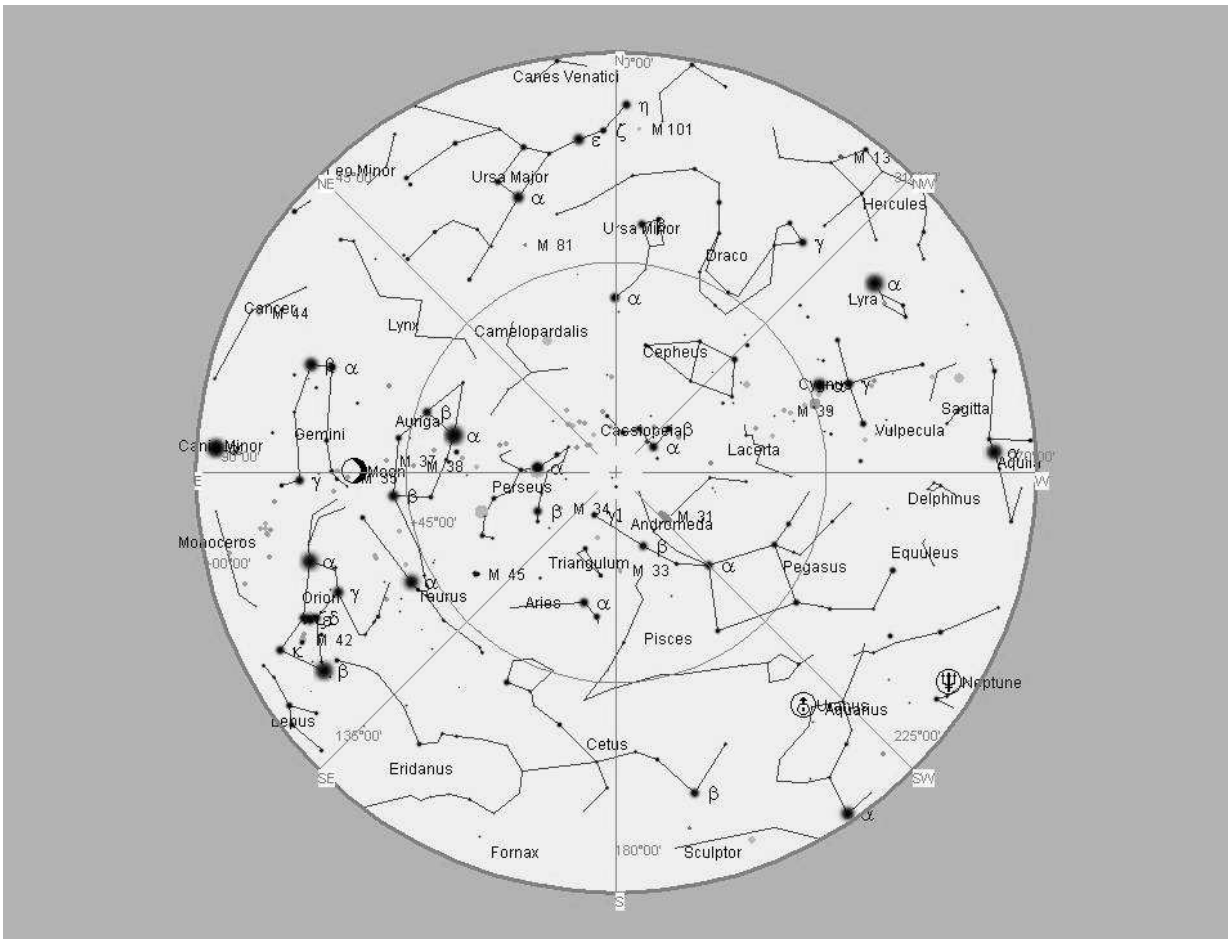
ASTROPHOTOGRAPHY BY JULIAN

Society member Julian Mole has recently started trying out some astrophotography using his digital SLR. This one is a stacked set of 3-minute exposures. If you have a driven telescope and a digital camera, you can probably buy an adaptor to fit the camera into the eyepiece hole. So instead of using the eyepiece, you use the camera. This loses magnification but turns your camera into a supersensitive imaging system. By stacking a series of images, you minimise the errors in tracking, and also reduce the risk of a satellite or plane, or next-door's security light ruining your completed photograph. You can use Registax software (free off the net – Google it) to align your photos. The signal to noise will be enhanced by having a series of photos. This is Julian's results on M31, the great galaxy in Andromeda, currently almost overhead in the late evening.

STAR CHART



The Night Sky at 10pm (GMT) next Saturday (15th November)

The great galaxy in Andromeda is almost overhead. See if you can spot it with the naked eye! The Moon is just past full, so that may stop you seeing something that faint tonight, but look later in the month and it will be much easier to see. Sweep the area of Perseus and Cassiopeia looking for galaxies and nebulae. There are lots to keep you occupied there. Orion is rising in the east – a sure sign that winter is on its way.

NASA TO RETURN TO THE MOON

No human has walked on the Moon since the Apollo 17 mission in December 1972. This time, though, the astronauts will stay much longer than the few days of the Apollo 17 mission. So now, NASA's Exploration Technology Development Program is working on everything that will be needed to make the Moon a place where a crew of astronauts can live for months.

Explorers from Earth will have to build their own habitat. There is no air on the Moon, and the temperature varies from -233 Celsius at night to +123 Celsius in the day. Tiny micro-meteoroids rain down on the Moon's surface, and no atmosphere of magnetic field means no protection from the Sun's harsh radiation.

So a Moon habitat for humans will have to be very tough and very sturdy. It will have to be airtight, so the inside can be pumped up with breathable air without exploding or leaking. The habitat will have to be cooled during the Moon day and heated during the Moon night. It will need a water recycling system, a power generating system, and food storage and preparation facilities. The materials to build the Moon habitat should be lightweight, since they will have to be boosted out of Earth’s gravitational field using rockets.The habitat will have to be sent to the Moon in pieces and assembled by the explorers once they arrive. So it will have to be easy to put together, since the Moon explorers will be working in space suits.

NASA's Exploration Technology Development Program is working on designs for a Moon habitat. The light-weight experimental house is inflatable, so would not take up much space until needed.