

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

8th February 2010

Fraser Clarke (Oxford University),
'Extremely Large Telescopes'

Welcome to our first speaker meeting of the new year. Tonight Fraser Clarke is going to talk to us about Extremely Large Telescopes – yes, that's even bigger than Owen's.

THE NIGHT SKY THIS MONTH

by Bob Dryden

Moon: Last month the Moon was the closest it was going to get to Earth in 2010, this month, on the 13th February, it will reach the furthest it is going to get for the year. However, you will not be able to actually look at it on that particular night because the Moon will be next to the Sun, i.e. New. Just for the record, at that moment, the Moon will be 406,541 km from Earth, and, if it had been visible, would be 29.5' wide.

Mercury: Throughout February Mercury continues this very poor morning apparition. However, by the second half of the month the planet will be too close to the Sun to be seen. Even before then, it is hard to find Mercury as it is barely 6° above the horizon at sunrise as this session begins and things are only going to become harder after that. Perhaps your best chance to find the planet comes on the morning of 12th February when a thin crescent Moon will hang just above, and to the left, of Mercury approximately 2° away. Mercury will be magnitude -0.2, but as it is so low you will almost certainly need binoculars to find it.

Venus: Venus is now officially an evening object, although to start with, it is a very difficult evening object to see. It is crossing Aquarius and Pisces, and you might just be able to find it by early March. Shining at a bright magnitude -3.8, it will be very low in the west as the sun sets. Be aware though, that you will only have about 15 or 20 minutes after sunset in which to find it before Venus itself disappears below the horizon. Observing opportunities improve as spring approaches.

Mars: After the excitement of last month's opposition, Mars begins to fall behind the Earth in space, and as a result, begins to fade and shrink in apparent size. Although it dims to magnitude -0.5 by mid March, this is still very easy naked eye brightness so you will not have any trouble finding Mars crossing Cancer. Its diameter in the telescope shrinks to 11.6", which means that disc detail will still be visible, but harder to see. Mars is visible just about all night at the moment so you have plenty of time to have a look at it. Don't forget to let the planet rise well above the horizon before you point your telescope at it, and take your time when observing

– you won't see all the detail the moment you peer into the eyepiece.

Jupiter: As Jupiter is in conjunction with the Sun on 28th February, this planet is unobservable this session.

Saturn: This is the other planet on view at the moment, rising about 21.00 UT in early February, becoming 19.00 UT by mid March. Still crossing Virgo, Saturn is easy to find at magnitude +0.7. The rings are closing slightly again, going from an angle of 4.6° in February to 3.7° in March. They will not disappear as they did at the end of 2009, so a small telescope will bring them into view for you.

Uranus + Neptune: Uranus is now getting hard to find as it approaches the evening twilight. It's rather faint magnitude +5.7 means you will need binoculars, and a good knowledge of the part of Pisces the planet is crossing, to find it in the bright evening sky.

Neptune reaches solar conjunction on 15th February so is not visible at the moment.

Occultations: There is an occultation of a reasonably bright star on the night of 20th February. At 23.00 UT the magnitude 4.6, epsilon Aries, is occulted by the gibbous Moon. What makes this occultation particularly interesting is that epsilon is a double star, whose components are magnitude +5.2 and +5.5. A small telescope will show the star as double, and during the occultation, instead of the star instantly disappearing, it will blink out in two steps. It will still be an extremely quick event, but there will be that split second delay as first one, then the other, star are covered by the lunar limb. The Moon is waxing, so the star will disappear behind the dark limb which helps with the observation, but you will need a telescope for this one as the Moon will probably be too bright for binoculars. At 23.00 UT the Moon will be about 16° high in the west.

On the evening of 21st February, the First Quarter Moon crosses the southern part of the Pleiades star cluster. Unfortunately, this time there are no occultations of any of the bright members of the cluster, just stars around 5th magnitude. The event starts around 19.00 UT when the Moon and the Pleiades will be in the south west at an altitude of approximately 60°.

Comets: Yet again, the two comets on view this session are the same two that I have mentioned in the last two Spacewatch.

The better of the two, in terms of brightness anyway, is comet 81P/Wild, which reaches magnitude +8.5 by mid March. Unfortunately, the comet is quite low in the south,

crossing southern Virgo. The good news is that it should continue to brighten into early April.

Better placed, but slightly fainter, is comet 2007 Q3 Siding Spring. Fading from mag. +9.0 to mag. +9.5 during this session, it crosses Bootes, and enters Draco. This means it will be circumpolar, although the best time to observe it will be in the morning sky.

Asteroids: 4 Vesta continues crossing the Sickle of Leo, which means it is a late night object. It does reach peak brightness this session, reaching mag. +6.1 by the end of February, before fading slightly to +6.3 by mid March. This is easily bright enough for any binoculars to show you Vesta as long as you have a finder chart.

Algol: Those of you who wish to watch a fade of the bright variable star Algol, can do so on any of the following nights, the times indicate when Algol reaches minimum but the eclipse occurs about 5 hours either side of the minimum: 10th Feb 23.5 UT, 13th 20.3 UT, 28th 4.4 UT, 3rd Mar 1.3 UT, & 5th 22.1 UT.

MOON PHASES:

New: 14th Feb.; First Qtr: 22nd Feb.; Full: 28th Feb.; Last Qtr: 7th Mar.

LAST MEETING'S TALK

by Gwyneth Hueter

Professor Malcolm McCallum is a 'gravity specialist' at Bristol University.

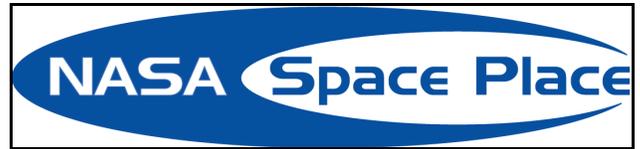
His talk, entitled "Was Einstein 100% correct?", and he concludes, "Not quite!"

He discussed Einstein's theories of Special and General Relativity and the differences between them.

Special relativity relates to the speed of light effects and how the difficulties of measuring the speed of light brought confusion among scientists. (Mainly because the speed of light is so fast!)

He explained the time dilation effect if you are moving at extreme speeds (twin paradox). He gave an example of this on Earth, where very short-lived muons, subatomic particles which are moving at nearly the speed of light, can be detected in the atmosphere. (They shouldn't, but their lives are apparently extended by the time dilation effect.) The Large Hadron collider relies on this effect.

General relativity relates more to gravity, gravitational redshift and gravitational lensing. With the advent of very long baseline interferometry (VLBI) it is much easier to study its effects using radio sources such as black holes and the curvature of spacetime around them.

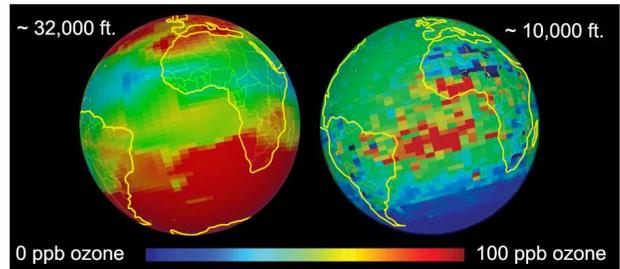


BUILDING A CASE AGAINST OZONE

by Patrick Barry

When it comes to notorious greenhouse gases, carbon dioxide is like Al Capone—always in the headlines. Meanwhile, ozone is more like Carlo Gambino—not as famous or as powerful, but still a big player.

After tracking this lesser-known climate culprit for years, NASA's Tropospheric Emission Spectrometer (TES) has found that ozone is indeed a shifty character. Data from TES show that the amount of ozone—and thus its contribution to the greenhouse effect—varies greatly from place to place and over time.



These images are TES ozone plots viewed with Google Earth. Colors map to tropospheric ozone concentrations. The image on the left shows ozone concentrations at an altitude of approximately 32,000 feet, while the one on the right shows ozone at approximately 10,000 feet. The measurements are monthly averages over each grid segment for December 2004.

"Ozone tends to be localized near cities where ozone precursors, such as car exhaust and power plant exhaust, are emitted," says Kevin Bowman, a senior member of the TES technical staff at the Jet Propulsion Laboratory. But the ozone doesn't necessarily stay in one place. Winds can stretch the ozone into long plumes. "Looking out over the ocean we can see ozone being transported long distances over open water."

Unlike CO₂, ozone is highly reactive. It survives in the atmosphere for only a few hours or a few days before it degrades and effectively disappears. So ozone doesn't have time to spread out evenly in the atmosphere the way that CO₂ does. The amount of ozone in one place depends on where ozone-creating chemicals, such as the nitrogen oxides in car exhaust, are being released and which way the wind blows.

This short lifespan also means that ozone could be easier than CO₂ to knock off.

"If you reduce emissions of things that generate ozone, then you can have a quicker climate effect than you would with CO₂," Bowman says. "From a policy standpoint, there's been a lot of conversation lately about regulating short-lived species like ozone."

To be clear, Bowman isn't talking about the famous "ozone layer." Ozone in this high-altitude layer shields us from harmful ultraviolet light, so protecting that layer is crucial. Bowman is talking about ozone closer to the ground, so-called tropospheric ozone. This "other" ozone at lower altitudes poses health risks for people and acts as a potent greenhouse gas.

TES is helping scientists track the creation and movement of low-altitude ozone over the whole planet each day. "We can see it clearly in our data," Bowman says. Countries will need this kind of data if they decide to go after the heat-trapping gas.

Ozone has been caught red-handed, and TES is giving authorities the hard evidence they need to prosecute the case.

Learn more about TES and its atmospheric science mission at tes.jpl.nasa.gov. The Space Place has a fun "Gummy Greenhouse Gases" activity for kids that will introduce them to the idea of atoms and molecules. Check it out at spaceplace.nasa.gov/en/kids/tes/gumdrops.

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

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.yahogroups.com> . You can also unsubscribe from the list here.

To post messages to the list, please send them to abingdonas@yahogroups.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

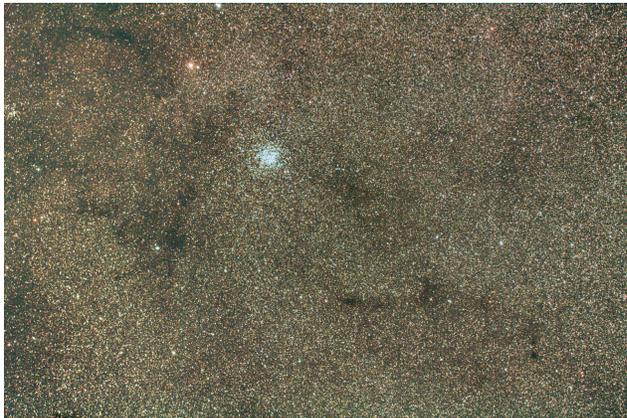
15th – 17th Feb. (First clear night) 8pm Observing evening at Britwell Salome. Ring Ian on 07817 687627 on the night to confirm if we are meeting.

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

8th Mar. 8pm Speaker meeting: Allan Chapman (Oxford University), "Astronomy and the early Royal Society".

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.
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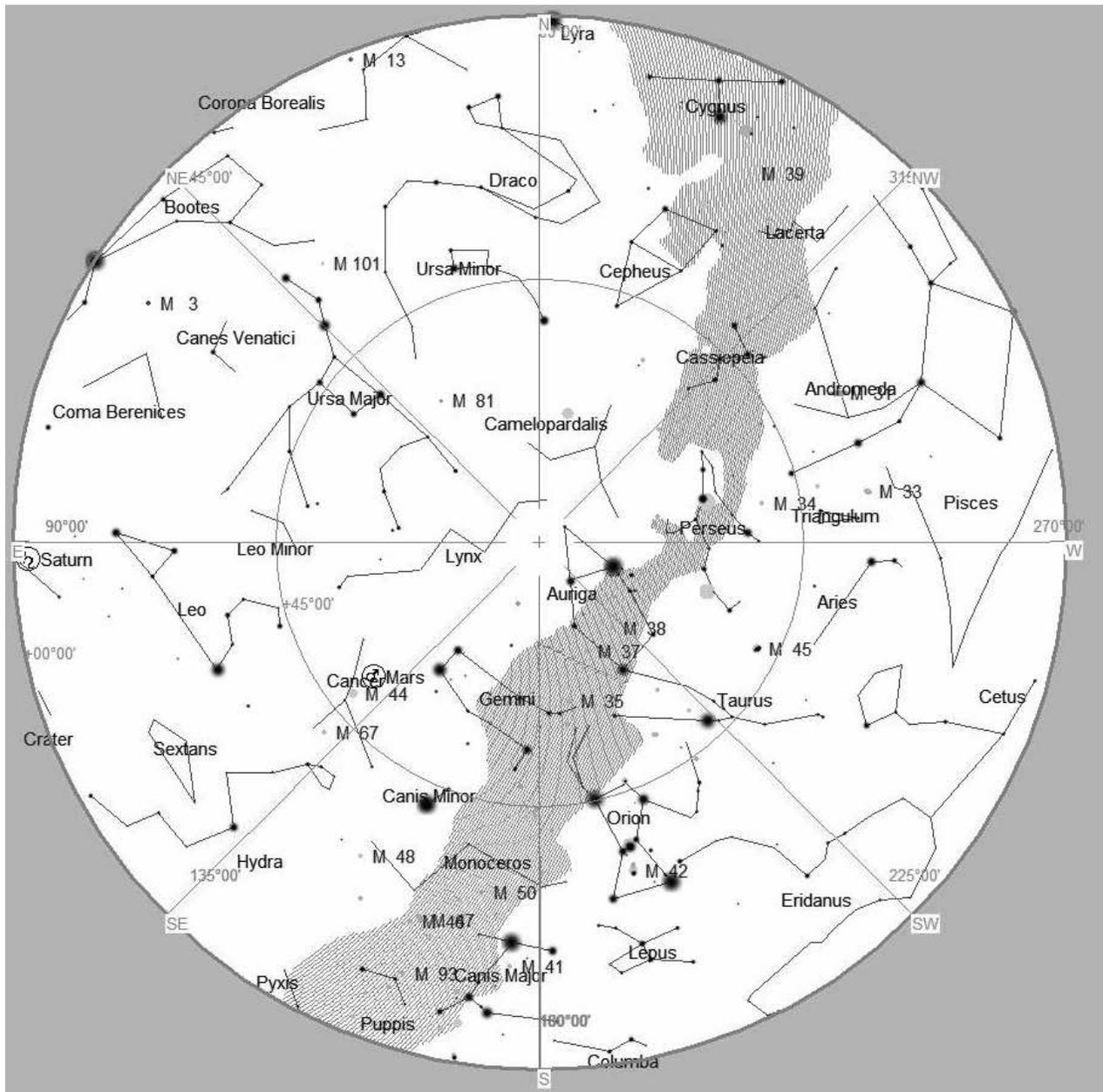
MORE MEMBERS' PHOTOGRAPHS



Left is a photograph of M11 in Scutum, taken by Paul McGale with a Canon 40D on a Williams Optics FLT98C f/6.3.

Right is a photograph of last month's full Moon, taken with a digital SLR by Julian Mole.

STAR CHART



The Night Sky at 21:00pm (GMT) next Saturday (13th December)

Orion is now past the meridian by 9pm but still dominates the southern aspect. The Milky Way stretches overhead from NNW to SSE. Almost overhead is Capella in Auriga. Just left of the twins in Gemini, Castor and Pollux is the red Mars, in Cancer. Saturn is just rising in the east.