

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

9th November 2009

Kim Ward (RAL),
'Space Instruments'

The evenings are so much longer now, and you can get outside and start observing much earlier. So there was a good side to that change to the clocks. Next month, the nights will be at their longest, and then they'll start to shorten again, so make the most of it. Don't get caught by the cold weather, the most important thing is to put thick socks on and have thick-soled shoes – it's generally cold feet that will send you scurrying indoors first. Oh, and don't forget a hat too.

THE NIGHT SKY THIS MONTH

by Bob Dryden

Mercury: As Mercury has just past superior conjunction (5th November), it is reappearing in the evening sky. However, this is an extremely poor apparition with, at best, the planet just 5° above the horizon and that's at sunset when the sky is still very bright. For the record, greatest elongation is reached on 18th December, but it will take a very determined observer to find Mercury this session.

Venus: Similarly, Venus is becoming harder to see as it too is getting much nearer the horizon, only this time it is in the morning sky. While Venus is very bright at magnitude -3.8, it rises later and later until by mid December it appears just half an hour before the Sun rises. If you can find it in your telescope you will see that its phase is nearly full now, while the disc is a rather small 10" (arc-seconds) in diameter as the planet moves away from the Earth. Moving from Virgo into Libra during this session, you will have to have a fairly clear south eastern horizon to stand any chance of seeing Venus before Christmas.

Mars: Although Mars does not reach opposition until next January, it is finally becoming a more interesting telescopic object. Currently in Cancer, it moves into Leo at the end of November and brightens to a respectable magnitude -0.4 by mid December. At magnitude +0.2 now, Mars is already easy to see with the naked eye. The planet reaches 11" in diameter by December, which means under good conditions, you should start to see some detail on the disc. Telescopically, you should also see that the disc is still not completely round. The angle of Mars, Earth, and the Sun is such that one edge of Mars is in darkness to us, although this effect is now gradually disappearing.

Jupiter: Jupiter is the bright 'star' low towards the south as it goes dark. Its magnitude, -2.3, makes it hard to miss, although telescopic views are often mediocre at the moment due to the planets low altitude. You need to make the most of any good

viewing evenings now as Jupiter will soon be too close to the Sun to see.

Saturn: Residing in Virgo, Saturn is a morning object, about 35° high at sunrise by December. At magnitude +1.0, Saturn is easy to find, and a small telescope will show you that the ring system is gradually opening up after the ring plane crossing a few weeks ago. The angle of the rings actually increases to +4.7° by December making them quite easy to see again.

Uranus + Neptune: Both these planets are well placed now for evening viewing. Uranus is magnitude +5.7 which makes it an easy binocular target if you have a good finder chart. Neptune is a slightly fainter magnitude +7.8, making it a harder (but still possible) binocular target. Actually, Neptune is now close to a group of three 5th and 6th magnitude stars (F1 42, 44, & 45) which greatly helps you in finding its position.

Occultations: There is one occultation of a reasonably bright star this session and this occurs on 4th December. At 21.51 UT the magnitude +3.5 star, delta Gemini, reappears from behind the dark limb of the Moon at a PA of 294°. The Moon will be at a nice 30° above the eastern horizon at the time.

Meteors: This is an interesting session for meteors with two major showers reaching their peak. Following on from last session, the Taurids are still active although they have past their maximum (3rd November). While there are not many per hour, you often notice them while out observing because they are quite slow, and sometimes quite bright. The first major shower to occur is the Leonids. Active from 15th to 20th November, this shower is past the storm levels of a few years ago but continues to surprise us occasionally. This year might be one such year because research has shown that there could be enhanced activity around maximum, which happens on the night of 17th/18th. Normally the hourly rate is around 20 meteors, but this year the rates could be as high as 100, or even more (some people are predicting several hundred an hour). Nobody really knows how many meteors there will be, or even if there will be more than usual, so the only way to find out is to get out there and watch. Fortunately, the Moon is New on the 16th and so will not interfere at all with observations. All we need now is a clear night.

The other major shower is the Geminids which are active from 7th to 16th December. Again, the Moon is completely absent on maximum night, the 14th, so this is a perfect opportunity to see plenty of meteors. Around the maximum, it is possible to get about 100 meteors an hour, and many of them are bright and often spectacular.

Comets: Comet 2007 Q3 Siding Spring is still around, crossing from Virgo into Coma Berenices, which makes it a morning object. It is predicted to be magnitude +10.2 throughout December but such predictions are fraught with doubt with comets. However, it is certain you will need a telescope for this one.

Another comet on the scene this time is comet 81P/Wild which rises from magnitude +11.3 in November to magnitude +10.4 by mid December (and, hopefully, will reach +10.1 by the end of the month). Again, this is a morning object as it is crossing Leo, and later, Virgo.

Asteroids: The asteroid 4 Vesta is now brightening to binocular range, going from +8.0 to +7.5 by December. It is presently in Leo, not far above Regulus which makes it a bit easier to find.

Algol: This famous variable star reaches minima every 2.87 days, going from mag +2.1 to +3.4 so you can watch the change in brightness with the naked eye. It takes about 5 hours to fade, and another 5 hours to regain its normal brightness. If you want to watch part (or all, if you are very keen) of the eclipse, minima are reached on the following dates and times: 11th Nov. 5.3UT; 14th Nov 2.1UT; 16th Nov 23.0UT; 19th Nov 19.8UT; 4th Dec 3.9UT; 7th Dec 0.7UT; 9th Dec 21.5UT.

MOON PHASES:

New: 16th Nov.; First Qtr: 24th Nov.; Full: 2nd Dec.; Last Qtr: 9th Dec.

LAST MONTH'S TALK

by Gwyneth Hueter

We have a brand new acquisition for our library, namely 'Fred Hoyle's Universe', a very impressive tome donated kindly by our last guest speaker, Dr Jane Gregory of University College London.

Her talk was based on her biography of him, but what he achieved is way beyond the scope of just one evening's talk. It seems he was quite a quiet rebel from even his early days as a schoolboy in Yorkshire, when he used to skive off from school and spend his time reading up on astronomy in the local library. Grammar school and Cambridge University (1936) followed and he was still a poor attendee, especially when he found out that his heroes Arthur Eddington and Ernest Rutherford were rather disappointing in real life.

It says a lot about the man that he still managed to graduate and went into radar development when war broke out. He ended up in the USA looking at radar installations but again got into trouble for gallivanting around astronomical observatories instead.

He later came back as a lecturer in Cambridge and got into research on how the heavy elements could be formed in the universe. He believed in a steady state continuous creation, and he himself coined the name 'Big Bang' for the theory that

had been put forward by the American George Gamow in 1946, namely that the universe had a sudden and explosive birth. Hoyle was actually being derogatory, as he thought that had to be nonsense!

The later part of Hoyle's life is quite intriguing:

- His BBC radio series on the nature of the universe earned him the 1950 title of radio broadcaster of the year.
- In 1965 he set up an Institute of Theoretical Astronomy in Cambridge in order to stop people from wanting to go abroad (yes, the 'brain drain' was a worry in those days too). And the radio evidence from that time (Penzias and Wilson's famous cosmic microwave background) from that time, made him accept that the Big Bang theory was probably correct.
- In the mid-1970s he joined forces with Chandra Wickramasinghe with theories on the building blocks of life originating in space dust. ('Lifecloud' 1978)
- Sir Fred Hoyle (1915-2001) was knighted in 1972. He also wrote a lot of fiction, the first of his books being 'The Black Cloud' (1957).



STARING AT LIGHTNING

There's something mesmerizing about watching a thunderstorm. You stare at the dark, dramatic clouds waiting for split-second bursts of brilliant light — intricate bolts of lightning spidering across the sky. Look away at the wrong time and (FLASH!) you miss it.

Lightning is much more than just a beautiful spectacle, though. It's a window into the heart of the storm, and it could even provide clues about climate change.

Strong vertical motions within a storm cloud help generate the electricity that powers lightning. These updrafts are caused when warm, moist air rises. Because warmth and lightning are inextricably connected, tracking long-term changes in lightning frequency could reveal the progress of climate change.

It's one of many reasons why scientists want to keep an unwavering eye on lightning. The best way to do that? With a satellite 35,800 km overhead.

At that altitude, satellites orbit at just the right speed to remain over one spot on the Earth's surface while the planet rotates around its axis — a "geostationary" orbit. NASA and NOAA scientists are working on an advanced lightning sensor called the Geostationary Lightning Mapper (GLM) that will fly onboard the next generation

geostationary operational environmental satellite, called GOES-R, slated to launch around 2015.

“GLM will give us a constant, eye-in-the-sky view of lightning over a wide portion of the Earth,” says Steven Goodman, NOAA chief scientist for GOES-R at NASA’s Goddard Space Flight Center. Once GLM sensors are flying on GOES-R and its sister GOES-S, that view will extend 18,000 km from New Zealand, east across the Pacific Ocean, across the Americas, and to Africa’s western coast.



The Geostationary Lightning Mapper (GLM) on the next generation of GOES satellites will detect the very rapid and transient bursts of light produced by lightning at near-infrared wavelengths. This image was taken from the International Space Station and shows the Aurora Australis and lightning.

With this hemisphere-scale view, scientists will gather an unprecedented amount of data on how lightning varies from place to place, year to year, and even decade to decade. Existing lightning sensors are either on the ground — which limits their geographic range — or on satellites that orbit much closer to Earth. These satellites circle the Earth every 90 minutes or so, quickly passing over any one area, which can leave some awkward gaps in the data.

Goodman explains: “Low-Earth orbit satellites observe a location such as Florida for only a minute at a time. Many of these storms occur in the late afternoon, and if the satellite’s not overhead at that time, you’re going to miss it.”

GLM, on the other hand, won't miss a thing. Indeed, in just two weeks of observations, GLM is expected gather more data than NASA’s two low-Earth orbiting research sensors did in 10+ years.

The new data will have many uses beyond understanding climate change. For example, wherever lightning flashes are abundant, scientists can warn aircraft pilots of strong turbulence. The data may also offer new insights into the evolution of storms and prompt improvements in severe weather forecasting. Staring at (FLASH!) Did you miss another one? The time has come for GLM.

Want to know how to build a weather satellite? Check the “how to” booklet at:

http://scijinks.gov/weather/technology/build_satellite.

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

16th – 18th Nov. (FCN*) 8pm Observing evening at Frilford Heath. Ring Ian on 07817 687627 for confirmation. [FCN = First clear night].

23rd Nov. 8pm. Beginners’ Meeting in the Perry Room.

7th Dec. 8pm. Yet another Beginners’ Meeting in the Perry Room!

14th Dec. 8pm Stan Cocking Memorial Lecture: Prof. Malcom McCallum (QMUL), 'Was Einstein 100% Right?'

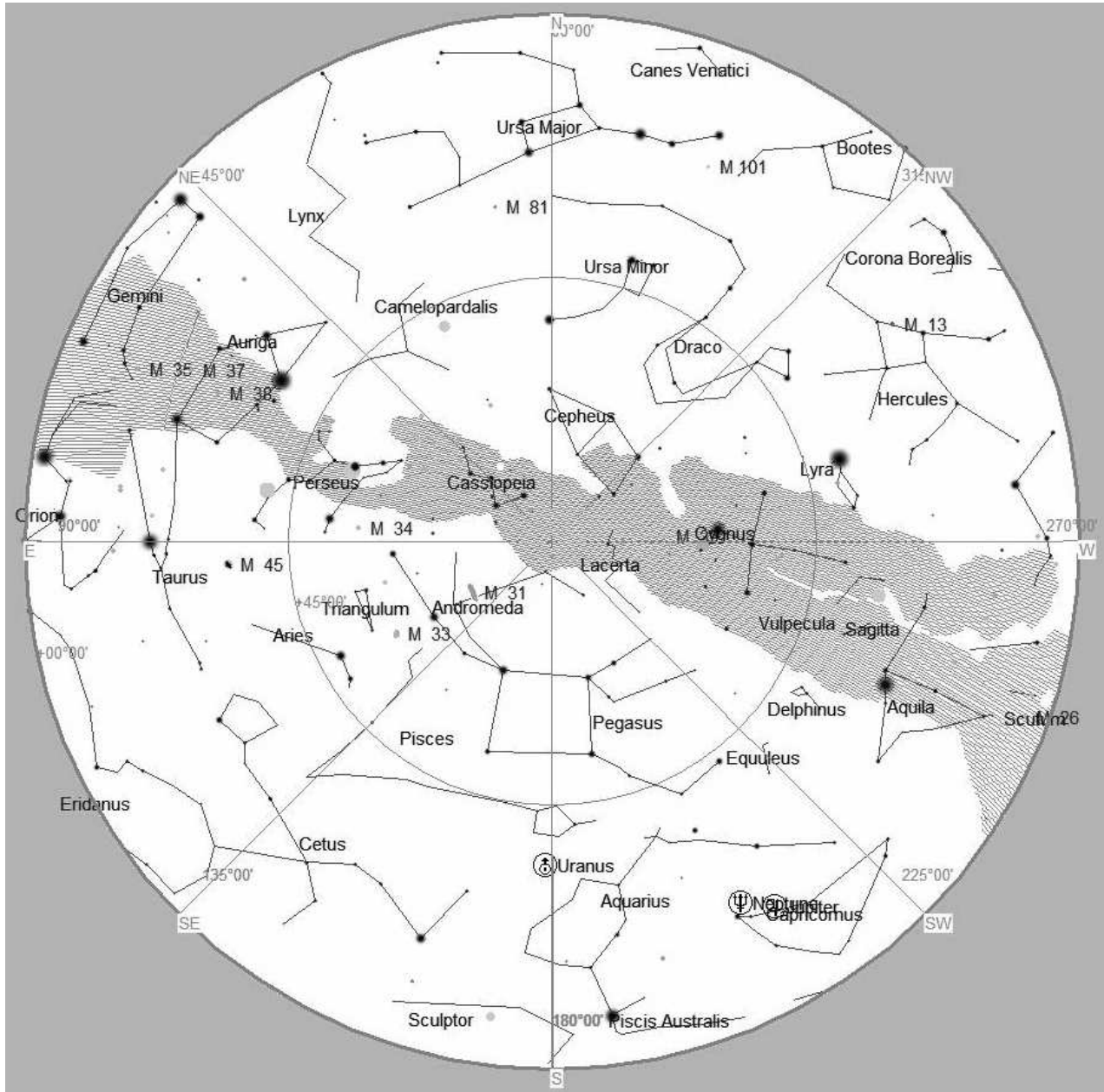
The editor of “SpaceWatch” is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:

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STAR CHART



The Night Sky at 21:00pm (GMT) next Saturday (14th November)

The Milky Way arches right overhead from one horizon to the other. From a dark site it is a remarkable sight. The square of Pegasus is almost overhead – face south and look right up. Use it to find our nearest galactic neighbour, M31, the Great Spiral in Andromeda. Jupiter is very low in the south-west – Neptune is very close by and Uranus is almost due south at 9pm. You will need binoculars to see the latter two.

Face north and you cannot fail to see The Plough, the main part of the constellation of Ursa Major, or the Great Bear. Use the pointers, the two stars on the right-hand side, to find Polaris, the pole star, so-called, as it appears to stand still as the rest of the sky revolves around it due to the rotation of the Earth. Polaris hasn't always been the pole star – the Earth actually wobbles, or precesses, once every 26,000 years. 14,000 years ago we had a much brighter pole star, Vega, in Lyra. Look there tonight and search for M57, the Ring Nebula, between the two western-most stars in Lyra. This is a planetary nebula, the dying throes of a star a bit larger than the Sun, throwing off its outer layers in a series of hiccups. The expanding gas is glowing from the bombardment of the hot star's radiation.