

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

12th March 2012

Mark Radice
(Salisbury Plain Observing Group)
'Lunar Observing'

I got my telescope out for the first time for a while the other night. I was showing a Japanese visitor Jupiter's moons, Venus, the Pleiades (or "Subaru" as they call them), and of course the Moon. You couldn't see much else for this Moon, almost full, lighting up the whole sky. It's not the best phase to look at the Moon through a telescope as there are virtually no shadows. Mark Radice, from the Salisbury Plain Observing Group (I bet it's darker there than in my back garden!) is coming along tonight to tell us a bit more about observing our nearest neighbour.

THE NIGHT SKY THIS MONTH

by Bob Dryden

Sun: On 20th March the Sun is in the constellation of Pisces, and at 05.14 UT it crosses the celestial equator heading north. This moment is called the equinox, and it means the days are now longer than the nights again.

Mercury: If you are keen, you might just be able to see Mercury in the evening sky for the next day or so before it disappears into the Sun's glare. Inferior conjunction occurs on 21st March after which the planet will reappear in the morning sky by about the end of the month. However, this will be a very poor apparition as Mercury will barely reach an altitude of 5° during the whole of this period.

Venus: Shining at magnitude -4.3, it is impossible to miss Venus now as it goes dark [Ed. Unless it's cloudy of course!]. It is about 40° above the horizon as the Sun sets and remains visible for nearly 4 hours. Venus reaches greatest eastern elongation on 27th March when it will be 46° from the Sun. At the time of greatest elongation, the planets phase should be 0.5% (or 'half' if you prefer). However, Venus exhibits something called the Schroter Effect which results in the 'half' phase occurring a few days before it should. A suitable observing project would be for you to estimate when you think the half phase is reached.

Venus and Jupiter are getting closer and closer to each other now. The minimum distance between them will occur on 14th March when they will be approximately 3° apart – close enough for some binoculars to show them both in the same field of view. On the evening of 25th March a crescent Moon will be close to Jupiter, with Venus above the pair of them. The following evening the Moon will have moved to be next to Venus. Both of these events will provide an excellent spectacle and a good imaging possibility.

Mars: Not only do we have the spectacularly bright planets Venus and Jupiter in the evening sky, but we have an unusually bright Mars for a short while. Mars is just past opposition now (which occurred on the 3rd March) so it is still very bright at magnitude -1.2. However, its brightness diminishes quite rapidly and is down to magnitude -0.4 by mid-April. Equally, the apparent diameter of the Martian disc decreases from 13.8" to 11.0" as the planet physically moves away from the Earth. 11" is still large enough though to allow you to see surface detail on the disc in a telescope. You have plenty of time to look at Mars at the moment as it is above the horizon for most of the night. It is crossing Leo and moves towards the bright star, Regulus, for most of this session. Around the middle of March, Mars is close to M95 and M96 which may provide some imaging opportunities.

Jupiter: As already mentioned, Jupiter is not too far from Venus in the evening sky this session. Shining at magnitude -2.0 means it is not as bright as Venus but still very easy to see with the naked eye. This session is the last chance to look at Jupiter this apparition before it moves too close to the Sun's glare. In mid March, the planet is about 40° high at sunset and sets around 4 hours after the Sun. By mid April it is just 15° high and sets just 90 minutes after the Sun.

Saturn: Saturn reaches opposition on 15th April when it will rise as the Sun sets. The planet is still fairly close to the brightest star in Virgo, Spica. Saturn is to the left of Spica shining at magnitude +0.3 so it is very easy to find. It rises at about 21.30 UT in mid March and by mid April it is visible by about 19.00 UT. The rings are at an angle of approximately 14° so are quite easy to see in a telescope.

On the night of 7th April the Full Moon, Spica, and Saturn are all in a straight line, close to one another.

Uranus & Neptune: Uranus is in conjunction with the Sun on 25th March and so is not visible this session. Neptune is technically visible in the morning sky by around April but will be a difficult object to find low in the south east.

Asteroids: Two reasonably bright asteroids are on view this session, and both are in the same part of the sky.

5 Astraea is in Leo and is fading now, reaching magnitude +9.9 by mid April (decreasing from +9.0 mag in March)

8 Flora reaches opposition on 15th March when it will be magnitude +9.1. It will then fade to +9.6 magnitude by mid April. This one starts the session in Virgo, but crosses in to Leo, not too far from 5 Astraea.

Comets: There is only one predicted bright comet this session and it is our old friend 2009 P1 Garradd. It is

currently in Draco, but soon crosses into Ursa Major before reaching Lynx by mid April. Currently at magnitude +7.2, Garradd is finally starting to fade and dims to magnitude +8.2 by mid April (by mid May it will be a faint 10th magnitude).

Algol: There are just three occasions when you can watch the variable star Algol dim this session. You can watch the star fade, and then brighten again for a few hours either side of the predicted time of minimum. Minimum brightness is reached at 04.00 UT 26th March; 0.8 UT 29th March; and 21.7 UT 31st March.

MOON PHASES:

Last Qtr: 15th Mar.; New: 22nd Mar.; First Qtr: 30th Mar.; Full: 6th Apr.; Last Qtr: 13th Apr.

LAST MEETING'S TALK

by Gwyneth Hueter

Dr Malcolm Coe of Southampton University called his talk 'Tides in the Universe,' but as his passion is clearly the Magellanic Clouds, two small neighbouring galaxies visible from the southern hemisphere, he needn't have changed the title from what we have on our calendar!

We are familiar with tidal effects in our backyard, thanks to the tidal power of our Moon. Further afield is the tidal effect of Jupiter on its icy moon Europa, which causes it to heat up inside and possibly have deep oceans below its crust. [He didn't mention the rocky Io, whose crust is the most active in our Solar system, thanks to Jupiter's effects.] Dr Coe then showed us pictures of galaxies interacting, what he calls 'galactic tidal wars'.

Then to his beloved Magellanic Clouds, which were first closely observed by Sir John Herschel when he visited the Cape Town Royal Observatory in 1834-38 (on Snake Hill, which was full of snakes, above a swamp which was home to hippos and lots of mosquitoes).

They are remarkable, the Magellanic Clouds. The Milky Way is about 10x the size of the LMC and the LMC is about 10x the size of the SMC. They have very low metallicity, which means they consist of material which has not been as heavily chewed up in star formation as has our Milky Way. They are more like what galaxies were like ten billion years ago. Therefore they are not satellite galaxies of the Milky Way but are being captured by its gravity now. The latest information from Hubble suggests that they will eventually break free. Our galaxy is exerting tidal forces on them, but the main tidal interactions are happening between the Large and Small Magellanic Clouds (LMC and SMC) and since about 200 million years, huge numbers of new massive stars are being formed. In Dr Coe's own words, the LMC is beating up the SMC and pulling a huge swathe of hydrogen off it in a bridge linking them (60° in length).

The remnants of these massive stars are being discovered in their droves, in the form of neutron stars and pulsars (same thing really, except that the latter is being excited by the stuff

surrounding it and giving off jets of high energy). Lots of these remnants are in the SMC, far more than in the Milky Way itself. Unfortunately we can't determine the ages of the pulsars because they don't live in a homogeneous medium; there are huge stellar winds in the SMC, so the pulsars react differently, depending on what's around them. Rotation speeds of less than one second to 564 seconds have been found so far. [He didn't mention binary pulsars.]

Dr Coe's final comment was that X-ray observations help us to plot these dead stars but there must be many more which are no longer detectable.



THE HIDDEN POWER OF SEA-SALT REVEALED

by Dauna Coulter

Last year, when NASA launched the Aquarius/SAC-D satellite carrying the first sensor for measuring sea salt from space, scientists expected the measurements to have unparalleled sensitivity. Yet the fine details it's revealing about ocean saltiness are surprising even the Aquarius team.

"We have just four months of data, but we're already seeing very rich detail in surface salinity patterns," says principal investigator Gary Lagerloef of Earth & Space Research in Seattle. "We're finding that Aquarius can monitor even small scale changes such as specific river outflow and its influence on the ocean."

Using one of the most sensitive microwave radiometers ever built, Aquarius can sense as little as 0.2 parts salt to 1,000 parts water. That's about like a dash of salt in a gallon jug of water.

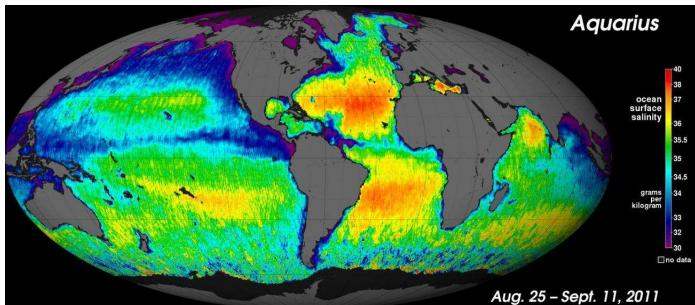
"You wouldn't even taste it," says Lagerloef. "Yet Aquarius can detect that amount from 408 miles above the Earth. And it's working even better than expected."

Salinity is critical because it changes the density of surface seawater, and density controls the ocean currents that move heat around our planet. A good example is the Gulf Stream, which carries heat to higher latitudes and moderates the climate.

"When variations in density divert ocean currents, weather patterns like temperature and rainfall are affected. In turn, precipitation and evaporation, and fresh water from river outflow and melt ice determine salinity. It's an intricately connected cycle."

The atmosphere is the ocean's partner. The freshwater exchange between the atmosphere and the ocean dominates the global water cycle. Seventy-eight percent of global rainfall occurs over the ocean, and 85 percent of global evaporation is from the ocean. An accurate picture of the ocean's salinity will help scientists better understand

the profound ocean/atmosphere coupling that determines climate variability.



"Ocean salinity has been changing," says Lagerloef. "Decades of data from ships and buoys tell us so. Some ocean regions are seeing an increase in salinity, which means more fresh water is being lost through evaporation. Other areas are getting more rainfall and therefore lower salinity. We don't know why. We just know something fundamental is going on in the water cycle."

With Aquarius's comprehensive look at global salinity, scientists will have more clues to put it all together. Aquarius has collected as many sea surface salinity measurements in the first few months as the entire 125-year historical record from ships and buoys.

"By this time next year, we'll have met two of our goals: a new global map of annual average salinity and a better understanding of the seasonal cycles that determine climate."

Stay tuned for the salty results. Read more about the Aquarius mission at aquarius.nasa.gov.

Other NASA oceanography missions are Jason-1 (studying ocean surface topography), Jason-2 (follow-on to Jason-1), Jason-3 (follow-on to Jason-2, planned for launch in 2014), and Seawinds on the QuikSCAT satellite (measures wind speeds over the entire ocean). The GRACE mission (Gravity Recovery and Climate Experiment), among its other gravitational field studies, monitors fresh water supplies underground. All these missions, including Aquarius, are sponsors of a fun and educational ocean game for kids called "Go with the Flow" at spaceplace.nasa.gov/ocean-currents.

This article was provided courtesy of 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 abingdonas 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 main meetings. You are most welcome to join us.

DATES FOR YOUR DIARY

19th – 21st Mar. (FCN) 8pm Observing Evening at Uffington White Horse. Ring Ian on the night to confirm on 07557 373401. [FCN=first clear night]

26th Mar. 8pm Beginners' Meeting in the main hall.

16th Apr. 8pm *Speaker Meeting*: Phil Marshall (Oxford University Physics Dept) 'How much does the Milky Way weigh?'

Note this is the third Monday in April (due to the second one being during Easter).

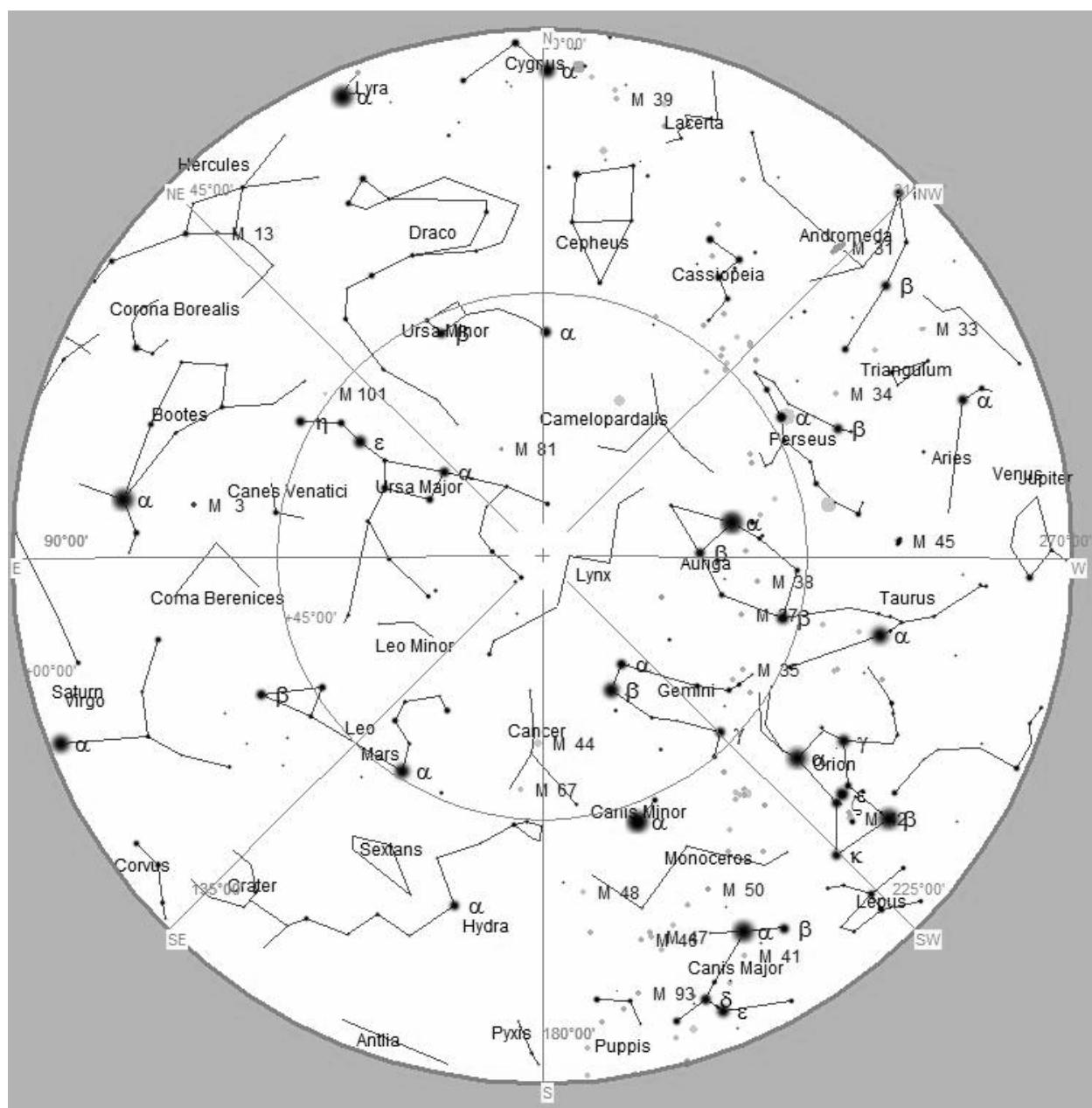
The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:

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STAR CHART



The Night Sky at 9pm (GMT) next Saturday (17th Mar.)

The plane of our solar system is very obvious at the moment. From sunset, we first meet Venus in Aries, then nearby Jupiter, then onto Mars in Leo and finally Saturn in Virgo.

Leo dominates the southern sky at this time of year. Castor and Pollux in Gemini are just right of due south. Orion is over in the south-west. Brilliant Arcturus is in the south-east. The Plough in Ursa Major is standing vertically on its handle in the north.