

## What's Up – December 2015

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#### Sun and Moon

The Third Quarter falls on the 3<sup>rd</sup> of December at 9h40 and the New Moon falls on 11<sup>th</sup> of December at 12h29. The First Quarter falls on the 18<sup>th</sup> of December at 17h14 while the Full Moon will occur on the 25<sup>th</sup> of December at 13h11.

The Moon will be at apogee (furthest from Earth) at a distance of about 404 799 km on the 5<sup>th</sup> at 16h57. The Moon will be at perigee (closest approach to Earth) at a distance of about 368 417 km on the 21<sup>th</sup> at 10h54.

#### Planetary and Other Events – Morning and Evening

Mercury is visible after sunset this month and is joined by the Crescent Moon on the 13<sup>th</sup>. Venus, Mars and Jupiter are visible in the morning sky this month, while Saturn becomes a morning sky object in Mid-December. By year end, all four planets are on display at dawn. Mars is best placed for observing this month. The last week of this year is great opportunity to view the four brilliant planets (Venus, Mars, Jupiter and Saturn), check them an hour before sunrise on the 25<sup>th</sup> of December.

Three meteor showers are active in December, the December Phoenicids (active 3<sup>rd</sup> December – 9<sup>th</sup> December, peaking on the 6<sup>th</sup>), the Puppis-Velids (active 5<sup>th</sup> December – 7<sup>th</sup> January, peaking on the 29<sup>th</sup>) and the Geminids. The Geminids are active from the 4<sup>th</sup> – 16<sup>th</sup> December, peaking early morning on the 14<sup>th</sup>. Observations of the Geminids, which are one of the strongest meteor showers, can be done from 23:30 PM to 3:00 AM on the night of the 13<sup>th</sup>/14<sup>th</sup> and the radiant is located towards the Gemini constellation in a NNE direction. Observing prospects for the Puppis-Velids are good and they are best viewed between 22:30 PM and 03:30 AM looking towards the constellations of Puppis and Vela.

#### The Evening Sky Stars

The stars of the Great Square of Pegasus and of Andromeda can still be seen low in the north, with the Andromeda Galaxy visible as a faint fuzzy spot below the star Beta Andromeda. It's believed that in another few billion years, this galaxy will collide with our own Milky Way. Gas and dust clouds will collide, producing large numbers of new stars, but the odds are that not even one star will collide with another. There's too much empty space. If the Sun were a 10cm ball, the nearest star system (Alpha Centauri) would be about 3000 km away.

Much of the sky on December evenings is dominated by 'watery constellations' and birds. Above Pegasus and Andromeda are the dim stars of the Fishes tied together at their tails with a knot, and above the Fishes is Cetus, the Whale, representing the sea monster coming to devour Andromeda. The most famous star in Cetus is one that's not usually visible. Named 'Mira', i.e. 'wonderful', it was first recognised as a periodic variable by the Dutchman Jan Holwarda, who found that this star (discovered in 1596 by Fabricius) reached peak brightness roughly every 11 months, when it would typically be visible as a fairly dim star. In between this mysterious object would disappear. We now know of many similar stars, all of them cool 'red giants' hundreds of times the diameter of our own Sun. If Mira were placed at the centre of our solar system, Earth would be inside it!

West of Cetus in the early evening sky is Aquarius the water carrier, while south of Aquarius are the stars of the Southern Fish, headlined by the brightish star Fomalhaut. West of the Southern Fish is the large dim triangle made by the stars of the Sea Goat. High in the south is the bright star Achernar, with the stars of the Phoenix (the Fire Bird) just above it and the stars of the Toucan and the Crane to the right.

The Peacock is moderately low in the SW, below and to the right of the Toucan. Continuing the birds-and-water theme, we find the Water Snake (which looks like a triangle!) directly below Achernar, while the celestial river Eridanus runs its course from Achernar to the knee of Orion, whose stars are rising in the east. Below Achernar and to the right, among the stars of the Toucan, is the dim glow of the Small Magellanic Cloud. The Large Cloud, below Achernar and to the left, is a bit easier to see, and was imagined by some South African groups to be a hunting plain for the gods. The two brightest stars in the sky, Canopus and Sirius, are rising in the southeast and east, respectively, with Orion shouldering his way into the summer skies in the northeast, preceded by Taurus the Bull. The small cluster of stars on the Bull's shoulder, the Pleiades, was used all over Africa to keep track of the seasons. In IsiXhosa, Pleiades is called Isilimela. Rising in the east as well is the Milky Way, dimmer than the brilliant Milky Way of winter, but still very impressive on a dark Karoo night.

#### The Morning Sky Stars

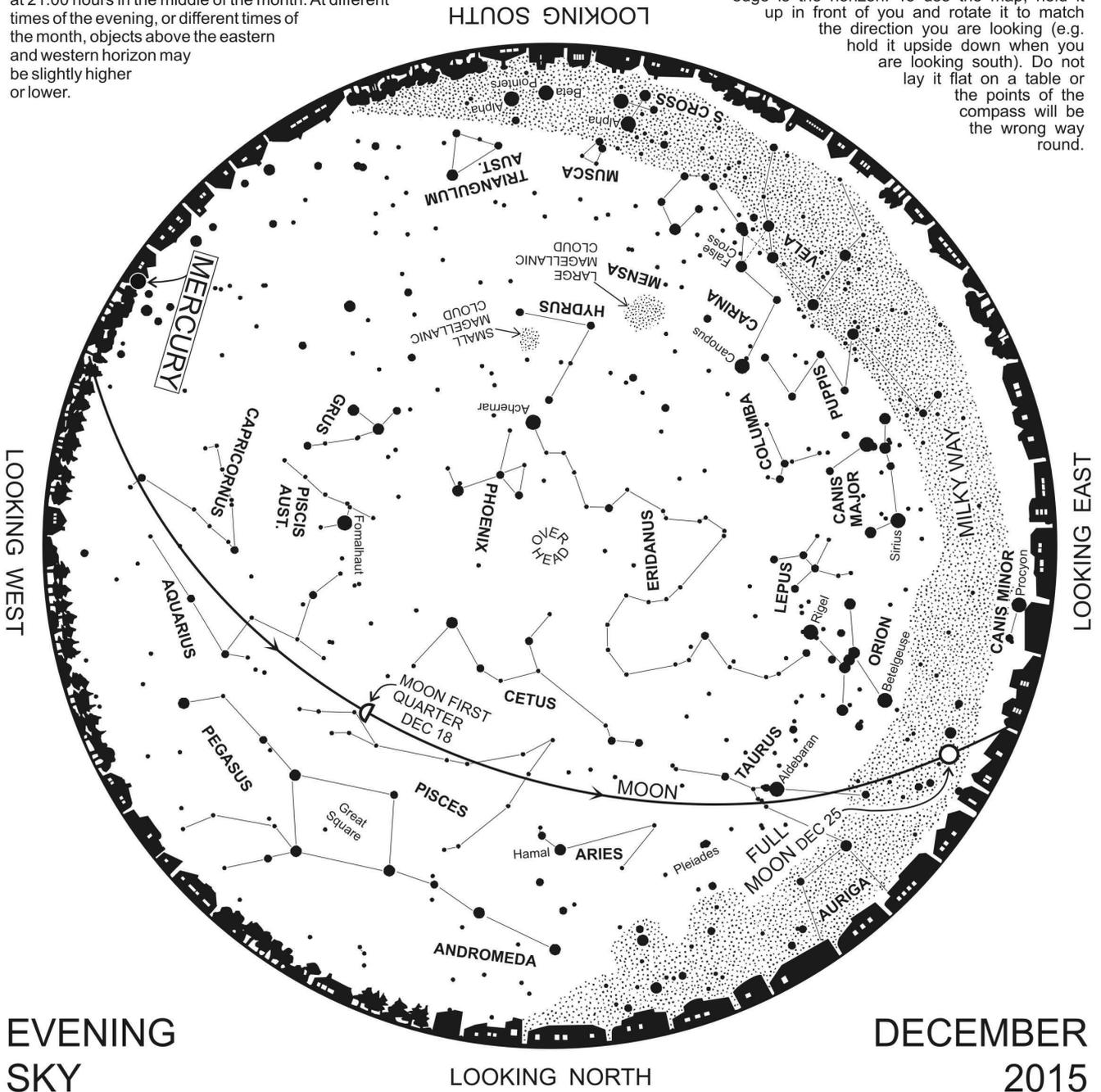
The Cross and the Pointers (the two brightest stars in Centaurus) are rising higher in the southeast this month. Just above the Southern Cross and the Housefly are the stars of the great ship Argo as it sails along the Milky Way, accompanied by the dim stars of the Flying Fish. The Milky Way still stretches across the predawn sky from the southeast to the northwest as it did last month, running from Scorpio in the ESE through the Wolf and the Centaur to Argo, then west through the stars of the Unicorn, Orion and the Twins. The southern part is much brighter with obvious dark patches, but all of it will reward a scanner with binoculars, revealing beautiful clumps and clusterings of stars. Away from the Milky Way, bright Arcturus glows orange in the NE, with blue-white Spica rising in the E and lonely Alphard, heart of the great Water Serpent, above Regulus high in the north.

If you look carefully at where most of the bright stars are, you'll notice that they are concentrated near the Milky Way, but offset a bit. These local bright stars are part of a 'spur' sticking out at a bit of an angle from the local spiral arm in the great pinwheel of stars that is our Milky Way Galaxy. Ironically, although most of the stars visible in the night sky are brighter than our Sun, most of the stars in the Milky Way Galaxy are much dimmer than the Sun. The common red dwarf stars that make up most of the population are too dim to see unless they are extremely close, while the rare super-giants are visible thousands of light years away.

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The map shows the night sky visible above the Cape at 21:00 hours in the middle of the month. At different times of the evening, or different times of the month, objects above the eastern and western horizon may be slightly higher or lower.

The centre of the map is the overhead point, the edge is the horizon. To use the map, hold it up in front of you and rotate it to match the direction you are looking (e.g. hold it upside down when you are looking south). Do not lay it flat on a table or the points of the compass will be the wrong way round.



Bright stars are often used as markers to find less well-known constellations. Overhead are Fomalhaut, Achernar and Canopus, indicating the positions of the constellations Piscis Austrinus (Southern Fish), Eridanus (River) and Carina (Keel) respectively. Low above the southern horizon are the two brightest stars known as the Pointers, Alpha and Beta Centauri, "pointing" to the Southern Cross (Crux). In Sotho and Tswana tradition the two brightest stars of the Cross and the Pointers are known as four giraffes, *Dithutlwa*. To the east the three bright stars in a row show where Orion, the Hunter from Greek mythology, is hunting the Bull (Taurus) followed by the Dogs (Canis

Major and Canis Minor). In Canis Major (Big Dog) is the brightest star in the night sky, Sirius. The observing prospects are favourable for the December Phoenicid (max. 6 December) and Geminid (max. 14 December) meteor showers. Planet Mercury moves from Ophiuchus to Sagittarius and is low in the west after sunset. The four other planets visible to the naked eye, Venus, Mars, Jupiter and Saturn are all low in the east at dawn towards the end of the month. Summer solstice is on the 22 December. The Moon is in the evening sky from 13 December until 26 December.

This map is given to those who attend the shows on Saturday at 13:00, Sunday at 13:00 and Tuesday at 20:00. It is copyright to the Planetarium.