

Heavens Above - A Chronicle - 07 - February Nights

As mentioned in the Introduction Section, this is a collection of my columns that specifically relate to things best observed in the month of February. In most cases, they could also be observed in January and March at later or earlier times respectively.

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1. Sirius, The Dog Star

for 3rd March 1999

If you go out after sunset and, facing north, look straight up, you will see a very bright star. In fact, it is the brightest star in the sky.

That star is Sirius, in the constellation Canis Major, which means the Greater Dog. You'll notice that it is east of Orion the Hunter, near Orion's heel. Canis Major is the larger of the two mythological dogs which followed at Orion's heels.

When you look at Sirius, you'll notice not only how bright it is, but how white, with a slight tinge of blue. It really is a dazzling object, especially in binoculars or a small telescope. Of course, what you won't see is its small companion star, which is possibly of more interest to astronomers than Sirius itself. This companion star, which is too close and faint to be seen against Sirius's glare except by the largest telescopes, is called a White Dwarf. It has the same mass as our Sun, but is about 50 times smaller. A cubic centimetre of this star would weigh about 1 tonne. Heavy stuff.

Not only is Sirius the brightest star in our sky, but it is also the 5th closest, 8.7 light years away.

From Australia, we can see Sirius shining up there during the evening from December through to April.

Because of its unmistakable brightness, Sirius has been the object of wonder and veneration throughout all of human history. The Egyptians revered it as 'the Nile Star' or 'the Star of Isis'. Its appearance each year heralded the rise of the mighty Nile, a key factor in Egyptian life, especially agriculture.

Sirius has many meanings, but the most common are 'the scorching' or 'searing one'. To most casual sky watchers, however, we know and love it as 'The Dog Star'.

2. Hail The Hunter

for 17th February, 1999

December to March each year is the time of Orion the Hunter, one of the most magnificent constellations in the sky. At about 9.00pm this week we see Orion as a very large constellation about 45 degrees above the horizon to the North. In later months it will start the night further west.

Because we see it upside down, it resembles a large saucepan with a handle at the top right. Look for the three distinctive bright stars

in a near horizontal straight line, and the small group of stars forming the handle. You will also see a bright white star, Rigel, above the 'saucepan' and a bright red star, Betelgeuse, below it. They are part of Orion too.

Now if you stood on your head and saw Orion as the Northern Hemisphere does, you would see ...the Hunter. The stars depict a tall man with his arms raised, holding some weapon. The three bright stars in line are his belt (the famous Orion's Belt) while the 'handle' is his sword hanging from the belt. Rigel is an ankle, while Betelgeuse is one of his armpits. Quaint!

This is such a striking image that every culture has a story about it, usually to do with national heroes or warriors.

Australian Aborigines call him Marigu-Jarn, the hunter who chased the seven sisters in Pleiades. Even J.R.R. Tolkien mentions Orion in his classic Hobbit tales as the 'Swordsman in the Sky'.

This constellation is full of marvellous stars and nebulae that we'll look at another time. To quote our stargazing Tennyson, again from 'Locksley Hall':

"Many a night from yonder ivied casement, ere I went to rest,
Did I look on great Orion, sloping slowly to the west."

3. The Heavenly Twins

for 20th February 2001

Shining brightly low to the north-east, about 25 degrees above the horizon, you will find two prominent stars 4.5 degrees (or 9 moon diameters) apart. They stand out like a pair of sore thumbs. These are the famous Twins of Gemini, one of the zodiac constellations.

They are better known as Castor and Pollux, the twin members of the famous Argonauts. Pollux is the brighter one to the east. The remainder of the constellation Gemini is strung out to the west of Castor and Pollux for about 22 degrees.

These two stars were venerated by the ancient sailors – mythology said they protected those who went to the sea in ships. Shelley wrote:

"When wintry tempests o'er the savage sea are raging, and the sailors trembling call on the Twins of Jove with prayer and vow..."
Twins in mythology maybe, but the two stars couldn't be more different. Pollux is closest at 36 light years and is a simple, unprepossessing giant star 35 times brighter than our Sun.

Castor, however, is a famous and fascinating multiple star, one of the most striking in the sky. While our naked eye sees a single blue-white star 47 light years away, modest telescopes reveal it has two stars orbiting each other and a third orbiting the pair. Triplets! But there's more... even more powerful instruments reveal that each of these three stars is in fact a binary – a very close pair of stars orbiting each other. Sextuplets!

So nothing in space is ever at it seems, and there's the fascination.

4. Eta Carinae, You'll Enjoy It

for 6th March 2001

If you want to see a grown amateur astronomer drool, ask him to show you Eta Carinae in his telescope. This is one of those unsurpassed gems in the sky, a treasure box of stars, clusters and swirling lane-crossed nebulae which astronomers never tire of exploring. Eta Carinae is in fact a massive star, once the second brightest in the sky, but we also give that name to the huge glowing gas cloud that now engulfs and hides it.

If you can't wait for a public star night, take a pair of binoculars out into your yard or a park, facing south, and see for yourself. It's easy to spot.

You'll find it immersed in the rich star fields of the Milky Way exactly mid-way between the Southern Cross (Crux) and the False Cross to Crux's west (it looks like Crux but is much larger.) With your naked eye, you will see a bright patch of light about four Moon diameters wide. This month, at about 9pm, you will find Eta Carinae and the False Cross almost directly above Crux.

With binoculars though, you will see amazing things. The nebula, glowing from the star Eta and other new born stars within it, is 9,000 light years away and a whopping 300 light years across. It looks like a white three bladed fan because of three dark V-shaped gas lanes that cut into it. But all around it you will see beautiful clusters and knots of stars of various shapes, each with its own name and character.

Then imagine what you would see through a telescope. And that's why astronomers drool.

5. It's A Dog's Life

for 18th February 2003

A part of the sky's Orion story is visible these nights in the tale of the two dogs, Canis Major and Canis Minor. If you look north and find Orion (the 'saucepan'), immediately to the east and slightly higher you will see the brightest star in the sky, Sirius. Sirius and the other group of stars to its south-east make up the 'larger dog.'

Below and to the north of Sirius is another bright star, Procyon. This, and the other star to its left, is the 'smaller dog,' sometimes called 'the pup.'

These were the two dogs put in the sky by Zeus to keep Orion company after he was killed by the scorpion. But there is another, more touching, Arab story about these two star groups.

One day, while on a journey, two sisters tried to follow their older brother when he swam across a wide river blocking their path. The older sister, being healthy and strong, was able to make it to the opposite southern side. But the younger weaker sister found the river too deep and the current too strong and finally just managed to make it back to the northern bank. There she stood all alone, weeping on the bank, looking yearningly across the river at her brother and sister on the opposite side. We can see the two sisters as Canis Major and Minor, eternally separated on opposite sides of the wispy star fields of the Milky Way, the celestial river.

6. Nip out for the Crab

for 4th March 2003

All through February, March and April, the zodiac constellation Cancer is in a perfect viewing position, directly to the north about 40 degrees above the horizon. Its five main stars are faint but form a large Y in the sky, about three times the size of the Southern Cross. You should be able to spot it midway between Procyon (in Canis Minor) and the sickle of Leo in the east but an easier way to find Cancer this month is to locate Jupiter, the brightest light in the evening sky. Jupiter is very close to the centre of the Y all this month.

Cancer is the crab which nipped Hercules' heel while he was battling the monster Hydra. For his cheek, Hercules crushed the crab under his sandal but Juno recognised the little nipper's courage and raised him to the sky.

A famous feature of Cancer is the beautiful star cluster called Praesaepe, or the Beehive, or M44. The Beehive is located just below and to the west of the star at the centre of the big Y. It is a cluster of around two hundred faint stars 500 light years away, each barely visible to the naked eye, but put together appear like a misty nebula three times the size of the Moon. Binoculars are the ideal way to enjoy M44 and show a swarm of about fifty distinct stars. By the end of March, Jupiter will be only 1 degree from the Beehive, a treat in binoculars.

7. Dogging our Heels

for 16th March 2004

Directly to the north, there are two constellations that contain a pair of stars that you might say are dogging our heels.

Around 9pm, about 50 degrees above the northern horizon, directly above Gemini's twins Pollux and Castor, there will be a bright yellow-white star with a fainter star below and to its left. That's Procyon, the main star of Canis Minor, the Lesser Dog.

Then another 20 degrees above and to Procyon's west, you will see the brightest star in the sky, the blazing white Sirius. It is the main star in the constellation Canis Major, the Greater Dog.

These are very interesting stars for many reasons. One is their close proximity to Earth. Sirius is both the brightest star in the sky (magnitude -1.44) and the 5th closest at 8.6 light years, while Procyon is the 8th brightest (magnitude +0.4) and the 13th closest at 11.4 light years. No wonder they stand out in the sky.

These two constellations were seen by the Greeks as the faithful hunting dogs of the giant Orion, who you can see immediately to the west of both dogs.

When Orion died from Scorpius's sting and was placed in the sky by Zeus as a tribute, Zeus also put Orion's two hounds up in the sky with him to keep him company.

The irony of this is that both Sirius and Procyon have their very own companions, tiny white dwarf stars that orbit them every 50 and 41 years respectively. Who's dogging whom?

8. Siriusly Heavy Stuff

for 1st March 2005

If you go out after sunset and look high up facing north, you will see a very bright star. That star is Sirius, in the constellation Canis Major, the Greater Dog, one of Orion's hunting pack.

Sirius really is a dazzling object, especially in binoculars or a small telescope. Not only is Sirius the brightest star in our sky, it is also the 5th closest, 8.7 light years away. What you won't see is its small companion star (the Pup), which when first discovered by measuring a wobble in Sirius' path across the sky, was too weird to believe. This star, which is too close and faint to be seen against Sirius's glare except by the largest telescopes, is called a White Dwarf, a special class of star. The Pup has the same mass as our Sun, but is about 50 times smaller and 90,000 times more dense. A cubic centimetre of this star would weigh about 1 tonne. Heavy stuff. But some recent white dwarves have been measured with densities up to 500 million times our Sun's. Very heavy stuff!

Astronomers couldn't believe this. It didn't fit their theories of stars. But, to misquote Shakespeare :

"The fault is not in the stars, but in their theories."

Mathematicians soon showed that a state of matter (called electron degeneracy) could exist under extreme pressure to account for such a star. Just as well – that's how our Sun will end up in 5 billion years.

9. Happy 400th Birthday

for 3rd February 2009

Welcome to IYA2009. This year has been designated world-wide by UNESCO as The International Year of Astronomy. It marks 400 years since Galileo turned the world on its head, changing science and our idea of our place in the Universe forever by pointing his new telescope at the stars in 1609.

There will be an international effort with one objective: to expose as many as possible of the world's 6.8 billion citizens to the Universe's wonders.

In Sydney there will be lots of astronomy related events during the year. It is expected the press will give more attention than usual to news on the astronomy front. A special feature will be '100 Hours of Astronomy', when on April 2nd – 5th, a 100 hour around-the-clock and round-the-globe marathon will aim to have 100 million people look at the sky through a telescope for the first time. Wow!

Macarthur Astronomical Society will be involved in the 100 Hours event. It will also be conducting a number of other public star nights through the year. Watch for notices in the paper and on the MAS website for details and get involved.

Happy 400th.

10. S is for Sauce

for 17th February 2009

Let's start the International Year of Astronomy with a fun asterism in the constellation Orion. We, Down Under, often call Orion by another name, the Saucepan, because to us, Orion's belt and sword, when seen upside-down, looks just like that.

And what do you put in a pan? Sauce, among other things.

If you look at Orion any night this week while it is high up due north, check out the three bright stars of its belt (the saucepan's base). These stars from lower left to top right, Delta, Epsilon and Zeta are only 2.75 degrees apart and fit neatly in any binocular's field of view.

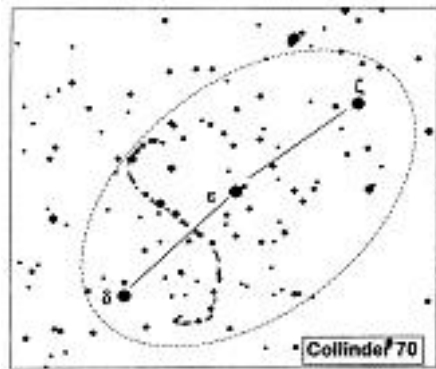
What appears to the naked eye as any empty bit of sky with just three stars in it, when looked at in binoculars becomes much more interesting.

There is a cluster of dozens of fainter stars in an oval area all around the belt stars.

This cluster is called Collinder 70.

What stands out is that between the left and centre stars and extending above and below them, is a curved trail of stars forming a very distinct S shape. To a mathematician it would resemble an 'integration' sign, while to others it looks like a sea horse. Luckily for us 'down under', it appears the correct way up. Go have a look in binoculars. It's quite obvious when you see it.

S is for Sauce (or Santa's sleigh?) See the sketch below to see.



11. Gone Fishing

for 2nd February 2010

Let's start this last year of the decade (yes it is, just think about it) with some holiday fun, a bit of fishing from the good ship Argo. You can find the Argo due south these nights, with its keel and deck marked by the Diamond and False Crosses (above the Southern Cross) and its steering oar marked by Canopus, the brightest star in that area.

Now there are two fish in the Argo's sea. The constellation Volans is a Flying Fish. Its stars are very faint, all 4th magnitude, but lie between and immediately west of the two crosses and beneath Canopus. It also is about 15 degrees due east of the Large Magellanic Cloud (LMC). Don't be surprised if you can't find it. It's probably ducked under a wave.

The other fish is the constellation Dorado, the Goldfish. It's more edible in its original name, the Swordfish. Dorado is also faint with only 3rd and 4th magnitude stars. It is located just west of Volans, above and to the west of the LMC. Both these fish are hard to see, let alone catch. Bad luck for the Argonauts.

12. Horn Swaggled

for 16th February 2010

There's an oft overlooked constellation having a playful frolic to our north this month. Its stars are faint at 4th magnitude but form a long flattened 'M' to the east of Orion and exactly midway between the bright stars Sirius and Procyon (about 25 degrees below and east of Sirius). Now you can paint an amusing picture with this, if you can imagine it all upside down as the northern hemisphere sees it.

Monoceros is a Unicorn, with one long nasty horn on its forehead. There is Orion the hunter, facing west, his club raised to battle the bull Taurus. Little does he know that the Unicorn is charging at his back, head down. The Unicorn is leaping over Sirius (Canis Major), Orion's larger hunting dog, while Procyon (Canis Minor, the smaller dog) has jumped onto the Unicorn's back, nipping his ears. Where is the horn aimed? Right at Orion's back-side. Poor Orion. Taurus's twin horns before him, and Monoceros's horn bringing up the rear. Ouch!

See if you can locate Monoceros from your back yard. If you can, shout very loudly: "Orion... behind you!" Your neighbours will understand.

(WATCH THIS SPACE FOR FUTURE FEBRUARY NIGHTS ARTICLES)