

Heavens Above! - A Chronicle: 05 - December 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 December. In most cases, they could also be observed in November and January at later or earlier times respectively.

CONTENTS LIST FOR DECEMBER NIGHTS

1. The Seven Sisters
2. Underneath the Armpit
3. It's a Bull's Eye
4. Cloud in the Sky
5. December Gifts
6. Mangers in the Sky
7. Rudolf Sleighs Them
8. Almost Antlers

1. The Seven Sisters

(For 9th December)

One of the most beautiful and famous star clusters is viewable from December to February in our Northern sky. This star cluster is so prominent and eye catching that it pops up in the legends and folklore of nearly every culture in the world, back to remote antiquity.

I'm talking about the Pleiades – the Seven Sisters. To quote Tennyson from 'Locksley Hall':

*“Many a night I saw the Pleiads,
rising thro' the mellow shade,
Glitter like a swarm of fireflies,
Tangled in a silver braid.”*

If you go out around 8 pm and look North-East, about 30° above the horizon you'll see a beautiful collection of stars resembling a small saucepan with handle (up-side-down) or even a baseball cap. They cover an area of sky about 2 to 3 Moon diameters.

The naked eye can see from six to nine stars in the group, depending on your eye and the darkness of the sky. The ancients used it as an eye chart. If you could see seven stars, you had 20-20 vision.

The Greeks named the seven main stars after the nymph daughters of Atlas and Pleione. The two stars at the tip of the handle are the proud parents themselves.

References to these stars abound. In the Old Testament, Amos chapter 5, verse 8, we read

“...Him that made the stars, the Pleiades and Orion...”

The Australian Aboriginals have a number of stories about Pleiades. In one the stars are Ngamma Gama, the seven sisters who are chased by the hunter through the bush to try and catch a wife.

To be totally different, the Japanese describe them as Suburu, meaning ‘a string of jewels’ and they appear in stylised form on the badge of that car. In fact, jewels are as common a description as sisters, a 13th century Persian poet Sadi describing

“...necklaces of Pleiades seemed to hang upon the branches of the trees...”

It’s a pity to interrupt the poetry with the scientific facts that the Pleiades is actually a cluster of about 200 stars (revealed in binoculars and telescopes) and are all about 360 light years away. They are mostly ‘new born’ giant blue-white stars, less than 50 million years old. That is, they are very young, very large, and very, very hot. But, after all, they are nymphs.

No wonder they are a beauty to behold.

2. Underneath the Armpit

(For 20th January 1999)

Last time we looked at the constellation of Orion the Hunter, seen upside down as the large saucepan. (Hint: If you turn your back to it, bend over and look at Orion between your legs, you see it upright as the Hunter. Try it if you dare. It works.) Now let’s look at one of its truly amazing stars.

The bright red star beneath the saucepan is Betelgeuse or ‘The Armpit of the Giant.’ (Remember... we’re seeing it upside down.) When you read about this supergiant star, you must be prepared to have your imagination challenged. Once you know more about it, ‘twinkle twinkle little star...’ will not seem appropriate.

Betelgeuse (some insist on pronouncing it Beetlejuice but it should be pronounced bet-el-gerse) is one of the largest known stars, with a diameter from 400 to 600 times our Sun’s diameter. That is, over 560 million kilometres. If we put Betelgeuse at the centre of our solar system, it would swallow up all of Mars’ orbit and more. A true supergiant.

Although 427 light years away, Betelgeuse is so big that large modern telescopes, such as the huge 10 metre Keck telescope in Hawaii, can actually detect the disc of the star, rather than just its bright light. We can’t even do that for Alpha Centauri, the nearest star which is only 4.2 light years away.

Also, because it is so big, Betelgeuse has a brightness of 14,000 of our Suns and is one of the brightest red stars known. But I’ve kept the most amazing till last. Though it has a volume over 60 million times that of our Sun, it has only 20 times the mass. Therefore, its material is very, very thin. In fact it has a density of about one ten-thousandth of the air you are breathing now. Think about that!

Although it’s a blazing red star of immense size and a temperature of about 3000°C, if you were to fly through it in a well insulated spaceship, you probably wouldn’t even notice. Stars like this have been described as ‘red hot vacuums.’

One day Betelgeuse will self destruct in a spectacular supernova, making it brighter than the full Moon. It could happen any time in the next 100,000 years and leave behind a huge Black Hole. So keep your eye on it.

3. It's a Bull's Eye

(For 3rd February 1999)

At this time of the year, if you look roughly north and half way up from the horizon, you'll be greeted by one of the most prominent and important star clusters in the sky. It will look like a big V pointing to the west. At the open end of the V, there is a flaming orange giant star, Aldebaran, 65 light years away.

This is The Hyades, tucked neatly between the smaller Pleiades (the 'mini-saucepan' on its left) and Orion (the big 'saucepan' on its right).

Hyades is the more obvious part of the larger constellation, Taurus the Bull, and represents the head of the bull. The giant red star Aldebaran is its eye. The tips of the bull's horns are way to the bottom right of the V, below Orion.

In ancient lore, the Hyades were associated with wet and stormy weather. In fact, the name is derived from an old Greek word for 'to rain'. Like the Pleiades and Orion, most ancient cultures seemed to have a common legend or myth about Hyades involving a bull. In Greek mythology, the stars of Hyades were the daughters of Atlas and Aethra and the half-sisters of the Pleiades seven. (Quite a lad, was Atlas.) The fourteen half-sisters were known as the Atlantides.

Not surprisingly, Tennyson had something to say about this star cluster. In 'Ulysses', he wrote:

"Thro' scudding drifts, the rainy Hyades vext the dim seas..."

Hyades is best viewed with naked eye or binoculars. Binoculars reveal more of the 200 odd stars that make up this cluster which is a mere 150 light years away. Try and see how many double, or binary stars you can see. Hyades has heaps of them.

But this seemingly ordinary group of stars is very important to astronomers. For reasons too technical to explain here, Hyades' stars provide a valuable clue to the distances to much further stars and even distant galaxies. It is a vital early step to calculating the size of the Universe. For example, without the Hyades, we'd only be guessing the 1,500 light year distance to Orion, and that's no bull.

4. Cloud in the Sky

(For 14th December 1999)

Can we see any galaxies, apart from our own Milky Way, with just the naked eye or binoculars? Surprisingly the answer is 'yes'. There are three that are easily visible to backyard astronomers.

Unfortunately, the best of these, the magnificent Andromeda Galaxy which is even bigger in size than our own and over 2.5 million light years away, is best seen high in the sky from the northern hemisphere. From southern Australia, it is so low on the northern horizon that it is drowned out by the glare of the Sydney lights. But if you can get away from the city light pollution, it is a naked eye visible smudge of light, made more attractive in binoculars.

But all is not lost. There are two smaller galaxies called the Large Magellanic Cloud (LMC) and the Small Magellanic Cloud (SMC) which are most visible at this time of the year. To the naked eye they will look like small clouds in the sky.

At about 9 pm, go out and let your eyes adjust to the dark for at least 10 minutes. This is most important. Then facing south, look straight up. You will see a bright white star, called Achenar. About 30 degrees to its left is an even brighter star. That's Canopus, the second brightest star in the sky.

Now about midway between Achenar and Canopus, at the same level as Canopus, you should see a faint glowing patch of sky. (In a dark country sky, this would be very obvious.) This patch of light is the Large Magellanic Cloud, a mini galaxy of about 10 billion stars, only 170,000 light years from us. It is the closest galaxy to ours.

If you use binoculars, you should see a specially bright knot of light at one end. This is called the Tarantula Nebula, a huge cloud of glowing gas with a spidery shape. Hubble telescope is now revealing nurseries of new born stars within the Tarantula Nebula.

If we can see this small close galaxy with our naked eye, just imagine what our Milky Way Galaxy would look like to a backyard astronomer on a planet around a LMC star. Spectacular!

5. December Gifts

(For 14th December 2004)

December is one of my favourite astronomy months. For the naked eye, binoculars or telescope, the sky has a lot to offer. Blessed are they with a non-light polluted northern horizon. While to the south the Southern Cross (Crux) stands on its head with Centaurus hidden beneath it, to the north a number of spectacular constellations stand up proudly.

Pegasus's Square and Andromeda are still visible to the north-west and with binoculars you may snatch a view of the Andromeda Galaxy's faint fuzzy glow. But the scene stealers are looming from the east.

First there are the Seven Sisters, the Pleiades, like a small baseball cap. Then to their right is the big inverted V, the Hyades. This represents the face of the bull, Taurus, with its angry eye, the red giant Aldebaran, watching Orion further to its east.

Orion is magnificent, with its bright white supergiant Rigel above and the blazing red supergiant Betelgeuse below. In the 17th century, a popular Arabian name for Orion was Al Jabber. Longfellow used a variation of that name in his Occultation of Orion:

*“Begirt with many a blazing star, Stood the great giant Algebar,
Orion, hunter of the beast! His sword hung gleaming by his side,
And on his arm, the lion's hide, Scattered across the midnight air
The golden radiance of its hair...”*

And between Rigel and Betelgeuse – the stark line of three stars marking Orion's belt and above it (because we see Orion upside down) his sword. Point some binoculars at this sword (or 'saucepan handle') and be amazed by what you'll see.

But it doesn't end there. Further to Orion's right is Sirius, the sky's brightest star with its dog's body, Canis Major, and immediately below it, the bright Procyon in Canis Minor.

Take time from now through to December's end to enjoy this gift of a sky. Happy Christmas everyone.

6. Mangers in the Sky

(For 12th December 2006)

Christmas is upon us, with a heavenly baby sleeping in a humble manger. We can see this story reflected in some celestial objects visible to both the naked eye and binoculars.

The constellation Cancer, a huge 'Y', rises after 11pm and is best visible to the north after midnight (late, I know). But at its center is a large loose open star cluster (the Beehive) also known as Praesepe – the Manger. The two stars above and below it are named the Southern and Northern Donkeys, standing guard at the manger. Was this the Christmas manger where the baby Jesus lay? A nice piece of imagery, anyway.

For the earlier birds, after 9pm the constellation Orion is well above the north-eastern horizon and the 'saucepan' is very visible. The center 'star' of the saucepan's handle is the beautiful Orion Nebula. Binoculars reveal the misty gas around a tight cluster of stars. This nebula is another heavenly birth place, only in this case it is stars being born. Only millions of years old, as stars go, these are newly born babies, and there are more being born even as we watch.

As you ponder these heavenly nurseries, have a Happy Christmas.

7. Rudolf Sleighs Them

for 9th December 2008

As we head into Christmas, I have taken some liberties with the Greek constellations for my final 2008 column.

From now right up to Christmas, you will be able to 'see' Rudolf guiding Santa and his gift laden sleigh across the northern sky.

Where? Just look north-east and find the big upside-down V (Taurus) and the famous Saucepan (Orion) to its east. With the right amount of Christmas spirit, you will recognise the bright red star in the V as Rudolf's nose. (The rest of the V is his antlers –his head is turned back towards the sleigh.)

The Saucepan can be seen as Santa's sleigh, with its high back seat. The bright white star above the sleigh is the white pompom on Santa's hat while the bright red star below it is a navigation light. (Yes, it's a stretch.)

Let the kids use their imaginations and enjoy it.

I wish all my readers a very Happy Christmas and have a happy and safe New Year. See you in 2009.

8. Almost Antlers

for 8th December 2009

At Christmas time, the littlies look to the sky for Santa and his reindeer. Ah, Rudolf with his red nose, magic flying hooves and... antlers. Sadly, there are no constellations in the sky for animals with antlers. But two come close, and by coincidence they are very close in the sky to Orion which, in my Christmas column last year, I likened to Santa sitting in his sleigh.

The constellation Taurus, seen as the big 'V' to the west of Orion, represents a bull which has horns. And further west of Taurus, between Taurus and the Square of Pegasus, is a simple constellation with three vertical bright stars, looking like a 5 degree long bent stick. This is the constellation Aries, representing a ram (more horns). And not just any ram, but the ram in the fabulous story of the Golden Fleece of Colchis, which Jason and his 50 Argonauts sought on their famous adventure.

So, to the north we have two horned animals strung out ahead of

(WATCH THIS SPACE FOR FUTURE DECEMBER NIGHTS ARTICLES)