

# Heavens Above - A Chronicle: 03 All Year - Part 3

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### 30. Midsummer Night Moons

(For 15th February 2005)

When I researched the answer to Shane Warne's half-million dollar question in *Celebrity Millionaire* the other week, I discovered that, to paraphrase the Bard, "All of Uranus is a stage and its moons merely players."

Warne's question was "The two largest moons of Uranus have names from which Shakespearean play?" I picked *The Tempest* (I knew Miranda was a Uranian moon). Warne's correct answer was *A Midsummer Night's Dream*. But when I looked up my solar system reference, I discovered that all 21 moons of Uranus with names (not numbers) were in fact, except for 2, from the Bard's plays.

The winning moons were Titania and Oberon from *Midsummer Night's Dream* because they were largest at 1,578 and 1,523 km diameter. The other moons are:

Miranda, Ariel (1,158km), Caliban, Stephano, Trinculo, Sycorax, Prospero and Setebos (*The Tempest*); Puck (also from ...*Dream*); Cordelia (*King Lear*); Ophelia (*Hamlet*); Bianca (*Taming of the Shrew*); Cressida (*Troilus and Cressida*); Desdemona (*Othello*); Juliet (*Romeo and Juliet*); Portia (*Merchant of Venice*); Rosalind (*As You Like It*).

The other two are Umbriel (1,097km) and Belinda (from Alexander Pope's *The Rape of the Lock*). Obviously when they started discovering Uranus' moons, someone thought 'Coriolanus', made the connection and the Bard's names flowed. They must have thought Uranus was stormy as they gave *Tempest* names to eight moons, three to *Midsummer's Night Dream* and one each to the other eight plays. And by naming two after Pope's poem, they went from Bard to verse.

## 31. Stars Trump Clouds

(For 24th May 2005)

The following doggerel tells the tale of that week's public night at Dudley Chesham Sports Ground (at the Oaks). As any astronomer will tell you, clouds are so unpredictable.

*There weren't too many folks, last week at the Oaks*

*Though our members and ten telescopes were there,*

*But the arvo's clouds were looming, and the evening's hopes quite dooming,*

*So the crowds stayed home to watch the TV's fare.*

*As fickle fate would have it, when the Sun set, like a rabbit*

*From a hat the stars and planets all came out.*

*The clouds dissolved – amazing, the Milky Way was blazing*

*With its stars and clusters, nebulae spread out.*

*Some couples, mums and mites, arrived to see the sights,*

*The lines were short as telescopes were many.*

*Jupiter made them drool, and Saturn's rings were 'cool',*

*And Jewel Box cluster shone as good as any.*

*The lesson to be learned, from this experience, as it turned*

*Into a night that provided stars galore,*

*Is to ignore the cloudy day, take a punt and drive away*

*To the Oaks and see what evening has in store.*

What was sadder than the above poetry was the fact that the clouds cleared for a beautiful night but the crowds had stayed away. Pity!

## 32. Why Don't Planets Twinkle?

(For 13th June 2000)

I'm often asked: "Why do stars twinkle and planets don't?" The answer is not what you may think.

It has nothing to do with the fact that stars are blazing infernos of seething gases, bursting with light and violent flares, while planets are placid spheres merely reflecting a small amount of light falling on them from our Sun. All that is true, but it is not why stars twinkle and planets do not.

Have you looked along a hot road in summer and seen the heat waves shimmering above it? When a car comes towards you, the car seems to shimmer and shake a little bit? Exactly the same thing happens to light from the stars and planets as it travels through the Earth's atmosphere to your eye. The atmosphere has turbulence and as a narrow ray of light passes through it, it is bent and lands on slightly different parts of your eye in a random pattern.

Now a star, while it may be millions of km in diameter, is a very long way away and to our eyes is a small single point of light. The atmosphere causes the light from this point to jump about very quickly on your eye and this gives the impression of 'twinkling.'

Planets, though smaller than stars, are much closer. We can see their disks as larger sources of light. Each point on that disk sends out a ray of light at the same time as the other points. The air turbulence plays the same trick with them but there are many more of them so their individual ‘twinkling’ gets averaged out, giving a much steadier image in your eye.

*“Though we can see you from afar,  
You twinkle twinkle little star,  
But planets don’t, it’s just not fair.  
So, simply blame it on the air.”*

## 33. So Much Space

(For 19th July 2005)

It may not look it from where you stand, but space is a very empty place. There is an awful lot of nothing between any two objects, whether they are planets, stars or galaxies.

It is very hard for our minds to grasp the huge distances in space. To help imagine it, let’s assume that our Sun is the size of a small grape, only 1 cm in diameter, in the centre of the cricket pitch at Campbelltown Apex Park.

Where would the Earth be? It would be the size of a grain of sand, orbiting 1 metre from the grape (the Sun). That’s not so hard. You can imagine that.

Where would Saturn be? It would be one twelfth the size of the grape, orbiting around the stumps at each end of the cricket pitch.

And what about Pluto, the edge of our solar system? It would be at about the start of Glen McGrath’s run up, half-way to the boundary rope.

That’s OK so far. We can imagine that...just. So how far is it to the next closest star, Alpha Centauri? It will be 260km away, the distance to Bateman’s Bay on the South Coast. And there is nothing – absolutely nothing in between.

But if you want BIG, how far is our grape sized Sun from the next nearest major galaxy, the Andromeda Galaxy? On this scale, it is the distance from the real Earth to our real Sun – about 150 million km. And on the same scale, the Andromeda Galaxy, like our own Milky Way, would be 10 million km in diameter.

Now that was if our Sun was the size of a grape. But the Sun is actually 1.4 million km in diameter, so all the distances in our little grape model have to be multiplied by 140 billion.

Try and imagine that.

## 34. 7 Up and 10 Down?

(For 16th August 2005)

As this article marks the completion of seven years of Heavens Above!, we note another claimed landmark in astronomy – the discovery of the ‘10th planet’ around our Sun. I had a small case of déjà vu when this was announced, noting that back in October 2002, after the discovery of Quaoar, I wrote “...the Kuiper Belt is being found to contain a lot of large objects. They expect to find many more, some even larger than Pluto.”

Well, now they have found one, estimated to be up to 1.5 larger than Pluto. But is it a planet? This is the hot topic these days, with almost everyone having an opinion. Sadly, the astronomers find themselves between the rock of scientific principles and the hard place of sentiment and public opinion.

The fact is that most astronomers, in the grip of objective logic, would admit that rather than call this new object the 10th planet, they should really down grade Pluto from planet to Kuiper Belt Object. Since we can't rewrite all those text books and upset the kiddies, that's not likely to happen. But what to do with Quaoar and Sedna? Should they be planets 10 and 11 and the latest 12?

Just what is a planet? Maybe more of that another time.

## 35. Close But Far Between

(For 13th September 2005)

If you were able to get out last Wednesday and see the beautiful arrangement of Venus, Jupiter, Spica and the Moon in the west after sunset, your reaction may have been the same as mine. It was awesome.

Yet there was a hidden paradox in that display of heavenly lights seemingly hung out upon the celestial tapestry. They looked like they were the same distance up there in the sky, just some larger or brighter than the others. The facts tell a different story.

Hanging below was the planet Jupiter, 11 times Earth's diameter and 950 million km away. The brightest 'star' was Venus, same as Earth's diameter but a mere 156 million km away. Poised between Venus and a fainter star was the 5 day old crescent Moon, a puny 400,000 km away. And that faint 1st magnitude star to the left of the Moon, Spica, is a staggering 262 light years away. All that contrast in one view.

And though your eyes saw it all at once, how long had that light been travelling? From the Moon 1.3 seconds, Venus 8.6 minutes, Jupiter 53 minutes and Spica 262 years. Wow!

## 36. Littering the Solar System

(For 22nd November 2005)

I have often said, it keeps getting weirder up there. As one astronomer famously observed, space is not only stranger than we imagine, but stranger than we can imagine.

It seems that the diminutive 9th planet is fighting back by raising the stakes. With calls for it to be demoted from status of planet to that of 'just another big Kuiper Belt object' which happens to have a small moon, Charon, Pluto has thrown down the gauntlet by revealing that it actually has another two moons. That makes three moons in total and the first known quadruple Kuiper Belt object. "Now say I'm not a planet" Pluto seems to be barking.

Astronomers using the orbiting Hubble Space Telescope have discovered the two new moons which are only about 150km and 100km wide. As they orbit Pluto in the same plane as Charon, astronomers think they are fragments of the huge impact on Pluto that created Charon. And there could still be smaller 'moons' too tiny to be picked up by Hubble.

Someone should tell Pluto to stop littering.

## 37. Winging to the Stars

(For 6th December 2005)

It's been "nice weather for ducks" lately, with welcome rain watering our gardens and catchment. But it's also been nice skies for our starry feathered friends if the clouds permit.

There are nine constellations that feature a type of bird, all of them clearly visible from our latitude. Two more, Pegasus (the winged horse) and Volans (the flying fish) also have wings but aren't birds.

The starry birds are Apus (Bird of Paradise), Aquila (Eagle), Columba (Dove), Corvus (Crow), Cygnus (Swan), Grus (Crane), Pavo (Peacock), Phoenix and Tucana (Toucan). At this time of year, seven of these nine are visible in the southern sky, though you have to hurry after sunset to see Aquila which is setting early. Corvus and Cygnus are northern constellations and won't be visible until February and August respectively.

Aquila and Cygnus have very strong mythological ties to Zeus, as do Columba and Corvus to the Argonauts and Apollo. The others were named by Dutch navigators exploring the south seas. Of these five, only Grus is easily identified by its long curving neck. The others are hiding in the heather.

## 38. Pity Poor Pluto

(For 4th September 2007)

Poor Pluto can't seem to take a trick. You'll remember that early this year Pluto was quite ceremoniously demoted from the status of 'planet' to the lesser status of 'dwarf planet'. This was because of a new definition adopted by astronomers for a planet and Pluto didn't cut it.

Pluto's disappointment was at least assuaged by retaining the title 'King of the Kuiper Belt', that rag-tag collection of rocks circling the Sun outside Neptune's orbit.

Now Pluto's lost even that claim to fame. In 2005 some astronomers announced another Kuiper Belt Object (KBO) that was of similar size to Pluto. Named 2003 UB313 (nicknamed Xena), and at twice Pluto's distance from the Sun, this has now been given the official name Eris, after the Greek Goddess of Discord and Strife who was sinister, mean and whose greatest joy was to make trouble.

True to type, Eris is now known to be larger than Pluto, so is the true 'King of the KBOs'. In a nice touch, Eris's 150 km diameter moon has been named Dysnomia, the Goddess of Lawlessness. And who played Xena in the TV show? Lucy Lawless.

Poor Pluto!

## 39. Shades of the Terminator

(For 11th January 2000)

Strange as it may seem, the best time to view the Moon is when there's less to see. It's a perfect example of 'less is good.' There's two reasons for this. Firstly, when there is a full moon, there is simply too much light. It is dazzling, overpowering, and it appears 'overexposed' to our eyes. Secondly, you can barely see any craters or mountains because the Sun is shining straight down on it and leaves no shadows. And it's the shadows we can see, not the craters themselves.

No, the best time to watch the Moon is when it is in crescent (like a banana) or gibbous (like a flattened rock melon) form.

And the best part of the Moon to watch is the Terminator. Now the Terminator is not a crazed robot with a tendency to promise "I'll be back". It is the line where the shadow meets the light on the Moon. And it is along this line, because of the distinct shadows, that the craters, valleys and mountains on the Moon stand out sharp and clear. Each night, as the shadow moves further across the unmoving face of the Moon, we see different craters and mountains. It's an ever changing moonscape.

With a steady pair of binoculars (try propping them against a wall or a balcony rail) or a small telescope, you will be transfixed for hours.

## 40. Jupiter Sports a Black Eye

(for 4th August 2009)

The big 'astronomy news' of the moment is the discovery by Australian amateur astronomer Andrew Wesley of Murrumbateman, NSW, on 19th July, of an unexpected black scar on the surface of Jupiter. (Add one to the amateurs' score card.) It wasn't there before then so astronomers agree it's new. But what caused it?

Though yet to be confirmed, they suspect it is an impact site from a comet. By coincidence, it is 15 years since the multi-impacts on Jupiter of the broken up comet Shoemaker-Levi 9 in July 1994 which gobsmacked astronomers back then.

This impact happened out of sight from behind Jupiter. The scar is the size of our Earth and the object crashing into Jupiter is estimated to have been about 500 metres across. This supports the description of Jupiter as 'the vacuum cleaner of the solar system'.

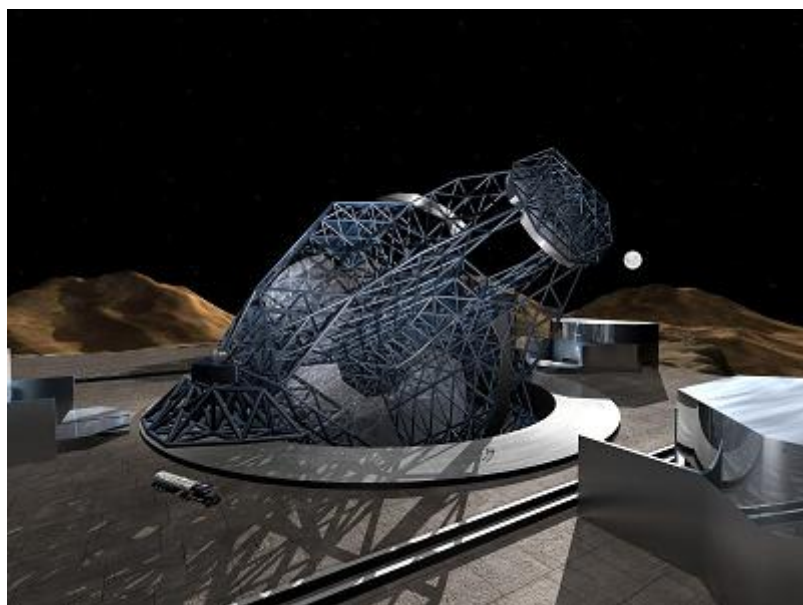
John Rombi, President of MAS reported he was able to see the scar in his 300mm telescope at 200x on Monday 27th July. As well as this impact scar, amateur astronomers have discovered two new red spots on Jupiter since 2006. So we can still make an impact.

## 41. The OWL is a Hoot

for 15th September 2009

There is a common affliction all amateur astronomers ultimately suffer from. Aperture Fever! Spouses beware and lock up your cheque books. It is the almost uncontrollable urge to buy a new telescope with an even bigger mirror than your current one, to tease out more of those faint fuzzies in the sky. Your telescope's only got a 300mm mirror? Well, splurge and buy a new 400mm telescope. And so it goes.

It may surprise you that professional astronomers can also catch this fever, but for good scientific reason. The bigger the telescope, the further into space and back in time they can see. Thus the current class of 8m and 10m telescopes called Very Large Telescopes (VLTs) on top of mountains in Hawaii and South America, are due to be dwarfed by a new era of 25m diameter telescopes, called ELTs – Extremely Large Telescopes. But this is a hoot... there is a 100m diameter telescope already on the drawing board, its mirror as wide as a football field. It has been dubbed the OWL – the Overwhelmingly Large telescope. But where will they find a mountain big enough to put it?



## 2. 50% More Milk Spilt

for 29th September 2009

Astronomers, like all scientists, will be the first to admit it when their theories need a tune up. That's how science progresses, with the acquiring of new data, and it's also what makes astronomy such an interesting hobby. There is always something new being discovered.

A team of astronomers at Harvard have made new measurements of the mass of our Milky Way galaxy. They have 'weighed' it again based on new data and, like that unpleasant surprise on the bathroom scales, have found it to be 50% heavier than thought, coming in at 3 trillion Solar masses. That is, 3 thousand billion times our Sun's mass, made up of stars, gas, dust and the invisible Dark Matter.

That means that our Milky Way is the same size (in mass and number of stars) as our nearest galactic neighbour, the Andromeda Galaxy which was always thought of as a big brother to us. Not any more. It seems we're twins.

As it was always thought that the Milky Way had about 400 billion stars, it could mean now that it actually has about 600 billion. Start counting. 1, 2, 3...

## 43. Never Too Young To Shine

for 13th October 2009

It seems to be the age of young achievers. The media is currently full of the story of the 16 year old Aussie girl out to sail solo around the world. While fearful for her welfare, we wish her a safe return. Not so well publicised are other young people blazing trails in less 'exciting' activities. Maybe not so glamorous (they won't get their story in a celebrity magazine) but certainly amazing in achievements rivalling their adult peers.

In November 2008 in the USA, a young woman participating in a project called The Puckett Observatory World Supernova Search discovered a supernova – the glare from an exploding star. Supernova 2008ha had scientific significance, being described as 'the wimpiest supernova ever seen.' Caroline Moore found the faint supernova in a even fainter galaxy 70 million light years away after carefully studying photos taken by a 400mm telescope. Her male peers were full of praise, as well as a tad jealous perhaps?

Why is this so special? Women astronomers have made great discoveries before. Perhaps it's because Caroline was only 14 years old? Watch out, older astronomers. The future's coming at you.

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**PART 3 WILL BE AUGMENTED WITH  
FUTURE ARTICLES.WATCH THIS SPACE.**