



# PRIME FOCUS

## Inside this Issue

Observing Dates	2
Down the Rabbit Hole	3
Lunar Eclipse	4
Who needs a Telescope	5
September Crossword	7
Back Focus	8
Aug Crossword Solution	8

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## Presidents Report

John Rombi

A BIG Welcome to all the members and guests here tonight, on this auspicious occasion. Our speaker is Professor Fred Watson, Astronomer in Charge of the Anglo-Australian Telescope at Coonabarabran. His presentation will be on Tomorrows Telescopes.

The largest optical telescopes at the moment are around the 10metre mark, but with the march of technology going ever forward who knows how big they will end up.

Fred has visited M.A.S. many times over the years and we are in excited anticipation for many months waiting for his arrival.

You may ask 'Why the anticipation? Fred is always able to deliver any topic with an enthusiasm unrivalled by other speakers. I'm sure he could make watching paint dry an exciting time!!

Fred, thank you for taking time out of your very busy schedule to pay us a visit.

## The Total Lunar Eclipse

Was on the 28th August, M.A.S. members turned out in force (18) to bring this rare and spectacular event to the people of the Macarthur area.

The weather (for once) co-operated and we were met with a clear sky. We assembled at The Campbelltown Rotary Observatory with more pieces of equipment than I had seen for a long time.

A couple of the members (Chris Malikoff and Daniel Ross) decided to record the event on their digital cameras. Chris has put a montage of his images together from the start to finish of the eclipse.

These are presented as an insert for Prime Focus this month (thanks Chris), These images have also accompanied an article in one of our local papers.

We had at a rough estimate 200 people look through our scopes that night. Not only was the Moon a spectacular sight, but with the darker sky at totality we were able to see the fainter deep sky objects that are usually not available at Full Moon. The other objects of interest were Jupiter, Alpha Centauri. Neptune and Uranus were visible on either side of the eclipsed Moon.

At the end of the night, the half dozen of us still left, were taking a well earned break when I was approached by a 'shady looking character' or so I thought, that was looking for Observatory director Ragbir Bhatla.

After a very busy day Ragbir had decided to go home, so I asked if I could help him. 'I'm from the Daily Telegraph' was the answer. 'I would like a rundown of the evening'

Immediately I had a tape recorder thrust in my face and was asked for a comment, well with the egging on of my fellow members I tried to remember how to speak. I was asked 'How would you describe the eclipse' I racked the marble in my head and came out with 'Brilliant, colourful, exciting' I considered it a reasonable save of face.

These words along with a mention of The Macarthur Astronomical Society made us the only club mentioned in the main stream media.

WELL DONE GANG!!

### **Last month**

Ian Cook gave us a presentation on the 'Southern Sky' This was an extended version given to the students at International House.

It was an eye opener to all of us to see the objects available for observation that we usually overlook for the more traditional Northern Objects.

Thanks for the lesson Ian, I will put the information to good use, when the sky eventually clears!!

### **International House**

Our get together with the students of The University of Sydney, (International House) on the 18th August went very well. We had a dozen members make the trip to Berrima for this annual event. These students come from countries that don't enjoy the dark skies we have here. Unfortunately the weather was unco-operative and it rained.

But ..The BBQ went ahead and we were very well fed. Afterwards Ian Cook (member) gave a presentation to a packed cabin, on the southern sky called 'Sky View 2007' This was a very well presented topic and Ian made sure that it didn't go over the heads of the listeners. THANKS IAN!!

### **Observing Schedule**

Unfortunately our observing schedule lays in ruins with the consistently cloudy weather at three quarter and new moon. Let's hope for better weather soon.

### **OBSERVING DATES**

06/10/07 Starguard  
13/10/07 Magellan  
15/10/07 General Meeting - Mark Suchting  
03/11/07 Starguard  
10/11/07 The Forest  
19/11/07 General Meeting - Don Whiteman  
01/12/07 Starguard  
08/12/07 The Forest

### **Magellan**

Our next trip to the Magellan Observatory (Goulburn) will be on the 12th, 13th and 14th October. At the moment we have only 4 members definitely going. If we can't increase this to 8, I will have to cancel the booking. I need to know by September 21st at the latest.

Well that's it from me, have a great observing month.

Clear Skies, John Rombi.

## Down the Rabbit Hole

Bob Bee

I ended my article 'Are you calling me dense?' with the quote: "The Universe is not only stranger than we imagine; it is stranger than we *can* imagine." For those uninitiated in current cosmology theory, you might want to take a stiff brandy, tighten your seatbelt and hold on to your hat. You are about to follow Alice down the rabbit hole.

The question of what makes up our Universe has always fascinated mankind. Up until around 1970, it was pretty easy. What you saw was what you got. That is, astronomers had been able, as far as modern visual and radio telescopes could take them, to identify all types of matter making up the Universe – planets, stars, gassy nebulae, galaxies, dust. Certainly a lot of it, but that was all. Such hubris!

It took a woman, astronomer Vera Rubin in 1970, to announce the shocking results of detailed observations of stars rotating on the outskirts of distant galaxies. They weren't behaving as they should. Something else, something dark and unseen, was out there. Naturally, being a woman, she was initially ignored, but eventually, as more data poured in, the astronomical community recognized the truth. There was mysterious matter out there, causing a lot of gravitational affects on galaxies, that couldn't be seen. With typical imagination it was dubbed Dark Matter.

It soon became obvious that there was a LOT of Dark Matter in the Universe, in fact about five times as much as normal matter. That was a scary thought. Over 80% of the Universe was made up of stuff we couldn't see but worse still, had no idea of what it was made of. Stuff scientists could not even conceive of (thus my earlier quotation). BUT, it had huge impacts on the way the Universe worked. Very strange indeed.

The Holy Grail of modern astronomy and science became finding the identity of this mysterious and ubiquitous Dark Matter. The hunt was on. Some credible candidates were found (brown dwarf stars, neutrinos) but these made puny contributions. Over 95% of Dark Matter was still the stuff of Wonderland.

*The Universe is full of stuff,  
Quoth the Mad Hatter.  
What we see is part of it,  
But most is just Dark Matter.  
(R Bee 2007)*

Then in 1998, Nature smote cosmologists with the second half of the double-whammy. They never saw it coming. The Universe, which was known by observation to be expanding from the Big Bang and, by all theories, ultimately slowing down due to gravity, was suddenly observed to be not slowing its expansion at all, but accelerating. Hopping Hubble and Einstein's Enigma, what was going on? Galaxies were flying apart faster now than in the past, not slower. It defied all common sense, all known physics, even good taste. But it is happening.

Any attempt to explain this phenomenon involves some heavy science so we won't go there. Suffice it to say that empty space, vacuum if you like, is now believed to contain a form of energy previously undreamed of. A repulsive energy. It's a property of space itself. And as the Universe expands and space grows bigger, that repulsive energy starts to dominate over gravity and causes the Universe's expansion to accelerate, not slow down. Excluding any future surprises, this should continue forever. In trillions of years, galaxies will be out of sight of each other. The name they give to this mysterious energy that space, or vacuum, contains, is Dark Energy.

You thought that was weird? Then hear this. Remember that with Einstein's famous equation  $E=Mc^2$ , energy is equivalent to matter and vice-versa. Calculations now show that the Dark Energy accounts for 70% of the Universe's matter. Dark Matter accounts for 26%. The rest, our traditional universe which we can actually see out there, including us, accounts for only 4% of the Universe's matter. We're small bikkies in the overall scheme of things. Or are we?

*All is dark, said the Universe,  
Energy and Matter.  
Not quite, there's still light  
Said the Mad Hatter,  
Amid all the dust and the stars  
Which are rife  
With planets all bursting  
With hope and with life. (R Bee 2007)*

# **Total Lunar Eclipse - 28th August 2007 18:00 - 22:15** (Pullout Collage Poster)

Chris Malikoff

This collage is made up of a string of photos taken with my Nikon D40 DSLR at prime focus on our William Optics Megrez 80SD 80mm achromatic refractor - mounted on an otherwise disused Celestron fork mount on a wooden plate bolted between the forks. Each photo was taken as a Nikon RAW image at it's 6.2 mega pixel native resolution which result in an image 3008 x 2000 pixels wide and high and approximately 5Mb in size. I took a series of images every 15 minutes to show this progression - but have chosen the number I have here to keep it simple and uncluttered.

The photographs were taken initially at 1/250th sec at f/6 (as determined by the scope) whilst the moon was at full brightness. As the moon moved into its penumbral phase I lowered the speed to around 1/100th sec and then finally to 2.5 secs as the moon entered totality. As the moon continued out the other side I reversed these settings. It was very difficult to take good photographs of the umbral phase because of the slow shutter speed and the rate at which the moon moves relative to the horizon. Next time I'll attempt to use my 12" Meade LX200GPS set to track the moon at it's proper rate and use an f/3.3 focal reducer so as to widen the normal field of view to be able to fit the moon in its entirety within the camera frame.

I opened each chosen image at 100% and used the circular cropping tool in GIMP (my preferred image manipulation program) to cut and paste the circular moon from the frame onto a collage page at A4 size.

Chris has kindly printed in colour a copy of his Lunar Eclipse Collage for all members. I have placed this as a pullout insert in this months Prime Focus... It makes a great poster -  
THANKS CHRIS

## Who Needs a Telescope

Ian Cook

On the night of the eclipse, I don't know about you but, I found myself mentioning the Man in the Moon, and some of the old stories about our sister planet that other cultures believed.

Such as the belief that a Dragon was eating the Moon which would bring everybody out into the streets banging drums, saucepans, pots and firing guns to frighten it away. This apparently worked because the Moon appeared again as a result. This was 'naked eye astronomy'.

Then I wondered how many of our MAS Favourites would have been known and regularly observed by naked eye in ancient times. The answer turned out to be very interesting!

A very quick skim through Richard H. Allen's book; "Star Names their Legend and Meaning" and a visit to the library to look for Greek and Roman Gods, led me on a twisted and sometimes, not so clear path.

It is generally agreed that the first sky object noted would have been the **Milky Way** galaxy disk spanning the dark sky with the brighter stars sprinkled upon it. This was identified with 'the campfires of the ancestors' by the Australian aborigines, and I'm sure there would be stories to explain this phenomenon in almost all ancient civilizations. The **Small and Large Magellanic Clouds** would have been noted by those under dark skies in the Southern hemisphere as well.

Many ancient cultures seemed to have noticed dark patches more than bright areas. There are many instances of named 'dark shapes', the aboriginal **Emu** being just one. In South America a "**temple of the fox**", has been uncovered recently, aligned with a dark shape near the stinger of **Scorpius**.

The origin of the constellations lies far back in prehistoric times and came from places like

Mesopotamia, Egypt, India and Ethiopia. The Assyrians and Babylonians along the Euphrates River recorded six constellations before 2000 BC. These were **Taurus** the first and most important, then **Cancer**, **Virgo**, **Scorpius**, **Capricornus** and **Pisces**. However, the constellation figures and boundaries were not defined

Some of the bright star clusters must have been known very early, even before the time covered by any ancient records; these certainly included the **Pleiades (M45)** and the **Hyades** clusters in **Taurus**, which are conspicuous to the naked eye, (the first certain documentation on the Pleiades is **Hesiod**, the Greek poet, about 900 BC).

Early Greek astronomers with unaided eyes saw only **Five Planets** which they linked with different gods according to their behaviour. **Hermes** (Mercury) was renowned for quick action and fast communication; **Ares** (Mars) was red so became linked with bloody war; **Aphrodite** (Venus) was bright and flirtatious; **Zeus** (Jupiter) moved in grand majesty across the heavens; **Cronus** (Saturn) was dim, slow moving and distant.

The Milky Way was the skid mark burned on the sky by **Phaethon** when he stole the chariot carrying the Sun from his father and raced uncontrollably through the night.

**Aristotle** in classical Greek times mentioned twelve constellations with a twelve-month lunar calendar year and have come down to us as the **Zodiac**. He may also have recorded ancient observations of the open star cluster **M41** in **Canis Major** around 325 BC; this would make the cluster the faintest object reported in ancient times. It could be that Aristotle also observed **M39** in **Cygnus** about that time, as a "cometary appearing object".

It would seem likely that the constellations associated with Greek gods and legendary heroes were popularly known, but not written

down, well before 1200 BC. This would include **Argo Navis** and the majority of the constellations north of 40° South with the exceptions of Canes Venatici, Camelopardalis, Columba, Fornax, Lacerta, Lynx, Monoceros, Scutum, Sculptor, Sextans and Vulpecula.

**Hipparchus**, the ancient Greek astronomer, did his observations from Rhodes between 146 and 127 BC. He identified 49 constellations, created the constellation of Equuleus (the Little Horse), and was the first astronomer to compile a catalog of stars. His catalog included two "nebulous objects", the **Praesepe** star cluster (**M44**) and the **Double Star Cluster in Perseus**, (NGC 869 and 884).

**Ptolemy**, (127-151BC) in his *Great Syntaxas*, better known as the *Almagest*, listed 48 constellations, twenty-one in the north, fifteen in the south and twelve in the zodiac. He listed seven nebulous objects, however three are star asterisms and not physical objects at all; and two are taken from Hipparchus (M44 and the Double Cluster in Perseus). However, two objects are new; "A Nebula behind the Sting of Scorpius" which is **M7 (Ptolemy's Cluster)**, and the **Coma Berenices Star Cluster**, now catalogued as **Melotte 111**.

The Romans did not contribute much to astronomy at all, preferring to give place to the Greeks. There were a couple of attempts to conjure up some constellation figures to celebrate contemporary leaders but they were never widely accepted and fell into disuse. Early Christian scholars also sought to place biblical figures in the sky but mostly they became dormant. Perhaps with the exception of Columba, which Lacaille revived?

The first truly "nebulous" object to be discovered and documented was the **Andromeda Galaxy (M31)**, observed around 905 AD and documented 964 AD by the Persian astronomer **Al Sufi** in his *Book of Fixed Stars*.

In a list of nine entries, he mentions a "nebulous star" little more than 2 degrees north of delta Velorum, which is certainly the open cluster **o Velorum (IC 2391)**. He includes six of Ptolemy's objects, and a new "asterism" in Vulpecula which we now know as **Brocchi's Cluster, Collinder 399**, or "the Coat hanger".

Chinese, and probably ancient North American astronomers, observed and recorded a supernova on July 4, 1054, which produced the **Crab Nebula (M1)**, one of the most interesting deep sky objects.

No more deep sky objects were discovered until Magellan, in 1519, logged the sighting of the **Large and Small Magellanic Clouds**. This brought the number of reported deep-sky objects to 13, although Al Sufi's work was not generally known at that time.

Johannes Bayer described and illustrated 48 constellations in 1602 AD. Just before Galileo introduced the telescope into astronomy in 1609. Galileo's tiny aperture revealed that Praesepe (M44) was not a nebula but a star cluster.

So how many "MAS Favourites" were known before the telescope?

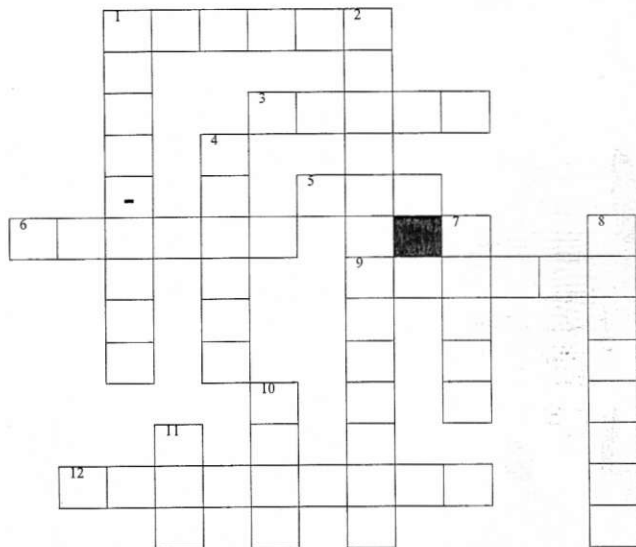
Well ... not many 'tis true; but out of nine star clusters listed then, eight are well-known to us in 2007. Furthermore, we know hundreds of clusters more than those ancient astronomers, and hundreds of stranger objects that they could never imagine.

Ptolemy's catalog contained seven or eight deep sky objects and 48 constellations. There were no additions to that body of knowledge for over a thousand years.

So, when you feel your telescope could be bigger, and your understanding of the night sky is going a bit slow, just think, you're seeing a whole lot more than the ancient Greeks and Persians!

# Crossword No6

Ivan Fox



## Across

1. Element first discovered in the Sun. [6]
3. Time in minutes the sun light takes to reach Earth.[5]
5. Original U.S.S.R Space Station. [3]
6. Orbiting Telescope. [6]
9. Consequence of Nutation of the Earths Spin Axis. [6]
12. Fate of Massive Suns. [8]

## Down

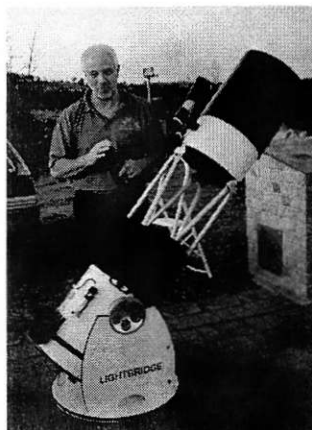
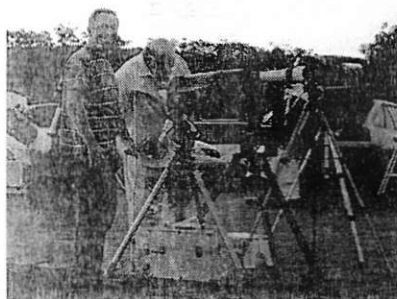
1. Comet. [4] – [4]
2. Focal length of Telescope divided by focal length of an eyepiece.[13]
4. Neutron Star that emits pulsed radio signals. [6]
7. Hottest Planet. [5]
8. Referring to The Veil, The Crab, The Triffid and the Lagoon. [8]
10. A Planet whose day is slightly longer than Earths. [4]
11. Slang term for Telescope that has colour dispersion correction. [3]



## Back Focus

Kate Johnston

I must say I thoroughly enjoyed the Lunar Eclipse Night at the Domes. I had never seen a lunar eclipse before and truly didn't know what to expect. As you all know my observing skills are not the greatest, I'm still learning my way around the star wheel! I am wanting to learn the art of astrophotography but as yet I haven't devoted a lot of time to it. Last year I bought the camera! A Cannon 400D so I've got the gear I just need to produce the goods. What I have been struggling to purchase is the T adaptor for the 400D everywhere I go they are sold out..... still I wanted to try it out and what better night than the lunar eclipse, sadly I can report that I didn't capture amazing photos but I did learn a lot about what not to do! ....Oh well it's all fun..... Here are a couple of setup photos ....



## AUGUST CROSSWORD SOLUTION

### Across

- |             |                |
|-------------|----------------|
| 1. Clusters | 4. Conjunction |
| 8. Sirius   | 9. Moon        |
| 10. Ions    | 13. Aperture   |

### Down

- |            |            |
|------------|------------|
| 2. Sun     | 3. BigBang |
| 5. Optics  | 6. Nebula  |
| 7. Compact | 11. Orbit  |
| 12. Core   |            |

## Prime Focus Article Submission

Deadline for article submissions for the October edition of Prime Focus is

**Monday 8<sup>th</sup> October 2007**

All Articles can be submitted via email [cyberpiggy@optusnet.com.au](mailto:cyberpiggy@optusnet.com.au)  
Or via snail mail to the MAS Postal address

Thanks to all the contributors for this month.....

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