

MACARTHUR ASTRONOMICAL SOCIETY Inc.

Journal



# PRIME FOCUS

Volume 7 Issue 8

August 2002

PRESIDENT  
NOEL SHARPEVICE PRESIDENT  
JOHN ROMBISECRETARY  
IAN COOKTREASURER  
JOHN KOSTEREDITOR  
BOB BEE  
Ph 46 251623

MAS : Postal Address PO Box 17 MINTO 2566 Phone 46271424

## President's Report

Greetings and welcome to all members and guests. At last month's meeting, we received communications from the SETI Institute of California, courtesy of our international guest speaker, Dr Doug Vakosh. I'm sure everyone enjoyed his presentation on a very fascinating subject. Many thanks to Carol Oliver for making it happen on a very tight time frame.

### Very very busy!

Our public education program has hit a real peak at the moment and the following has already happened or should occur at time of writing.

23/7 – Women of All Age Group at Picton. (John Rombi, Dick Everett, Noel Sharpe.)  
6/8 – Japanese Exchange Students at Kentlyn. (Ian Cook, John Rombi, Lloyd Wright.)

8/8 – Combined Provus Club at Camden. (John Koster)

10/8 – International House at Belanglo. (A lot of us.)

13/8 – Combined High Schools – Broughton & St Patricks.

16/8 – Nepean Open Night

17/8 – Campbelltown Rotary Observatory Public Night.

### ...and more to come!

13/9 – William Carey Christian School

14/9 – Girl Guides Group at Silverdale

TBA (maybe October) – Leumeah 1<sup>st</sup> Cubs Group.

Please bear in mind that the above program mixes with our existing planned activities. (See other program in Prime Focus.)

It does look like a very big commitment for us, but remember some nights only require a minimum number of members, many members are willing to contribute, thus

sharing the load, and indeed get much enjoyment from sharing their knowledge and expertise. It's just great that astronomy can be so popular and that we can offer something real and tangible.

Well, I have to go as there are a tonne of things to do and organise. My many thanks for making this a great club to belong to.

Regards,

Noel Sharpe – President.

## FANS 2002 by the Macarthur Spy.

The only Astronomical Society I have ever had contact with is Macarthur so for the last year my impression has been that all Astronomical Societies are much like your own. My experience at FANS showed



me that this just isn't the case. I am excited to say that the professionalism and knowledge that the members of Macarthur process and project to an outsider is of a remarkably high standard.

Unlike the members of MAS that attended FANS I had the opportunity to walk around the oval and view the sky through the eyes of other Societies. I didn't quite get time to have a look through all telescopes and talk to all astronomers present but I do believe I came very close. On this experience alone I cannot write enough praise for the members of Macarthur. Looking through a MAS member's telescope is a completely different experience, not only is the clarity of the view exhilarating but their astronomical knowledge of the sky is outstanding and on this particular night in my view among the best. I'm not alone when I say this, the oohs and aaahs that were heard around the MAS area and the length of the queues to look through a MAS scope far outweighed that of other areas.

I also had a chance to attend a few of the lectures held on the night. I found these very informative and well worth the time just get in early I think the hardest thing was to get a seat!!!

Well done to all members, not only the ones at MAS but as a group I am proud to be

associated with you all ... and, OK, one in particular!!!! Hopefully next year MAS can have a greater presence at FANS and really steal the show!!

Kate

### Blue Stragglers:

An old dog is doing new tricks. The ancient globular cluster 47 Tucanae which formed many billions of years ago had a recent closeup taken of its dense stellar center by the Hubble Space Telescope. Pictured were mysterious stars called "blue stragglers." Stars as bright and blue as blue stragglers live short lives, much shorter than the age of the host globular cluster itself. But this contradicts evidence that globular cluster stars formed all at once. Although this problem has been known for almost 50 years, a mass and spin rate for a blue straggler was first published last this year. This new information indicates that BSS 19 was rejuvenated by two orbiting stars slowly coalescing, and not by a dramatic collision.

### The Long Climb from the Sun's Core

You may have noticed that the Sun has two overwhelmingly obvious characteristics: it's bright, and it's hot. These two things are related. The source of the Sun's heat wasn't understood until the middle of the 20<sup>th</sup> century, when nuclear fusion was first being mathematically analyzed.

Although even today we do not completely understand what is happening inside the Sun, we have a pretty good grasp of it.

Basically, the nuclei of hydrogen atoms are compressed together so hard that they fuse to form helium atoms (the actual process is quite a bit more complicated, but fusion to helium is the end result). This releases a tiny bit of energy. At least, tiny when you only do it once. But the Sun converts millions of tons of hydrogen into helium in its core *every second*, and so a **lot** of energy is released. This energy is in the form of photons, or light.

These photons have to work their way out from the core of the Sun to the surface. That's a distance of 700,000 kilometers, or almost twice the distance from the Earth to the Moon, so you might expect it takes a while. You might *not* expect just how long it does take.

The centre of the Sun is extremely dense, and a photon can only travel a tiny distance before running into another hydrogen nucleus. It gets absorbed by that nucleus and the re-emitted in a random direction. If that direction is back towards the centre of the Sun, the photon has lost ground! It will get re-absorbed, and then re-emitted, over and over, trillions of times. The path it follows is called a "random walk" (or sometimes a "drunkard's walk"). Eventually it does



make its way to the surface, but it takes a long time: the average time from creation to freedom through the Sun's surface is about a million years! So the light you see from the Sun is really very old. The photons were first emitted long before our civilization began!

## A Glance at the Year.

7/9 – Belanglo Forest  
14/9 – The Oaks  
16/9 – General Meeting

5/10 – The Oaks  
12/10 – Obs. Public Night  
21/10 – General Meeting

2/11 – The Oaks  
9/11 – The Oaks  
18/11 – General Meeting

7/12 – Belanglo Forest  
14/12 – The Oaks  
(Whew!!)

## Way to Go Belanglo

I don't know how many of you turned up at the Oaks on 10<sup>th</sup> August – not many I'd guess by the number who were at International House Belanglo. And what a night that was!

I'd estimate there were around 40 uni students of both sexes, ranging in origin from USA, England, Canada, Hong Kong, China, you name it. What a great bunch they were too, with plenty of questions and lots of youthful enthusiasm. I only wish I had the

opportunity at their age to benefit from a group such as ours to show them the sky.

Belanglo turned on one of the most beautiful skies I think I have ever seen – and without the frozen toes and fingers. The Milky Way did its '6 inch brush and bucket of whitewash' impression. Globulars and nebulae just shone out to the naked eye.

And how's this for a yard stick – I had mentioned Scorpius (which I knew was directly overhead) but when I tried to point it out to some students, I had trouble initially finding it – there were just too many stars.

The night was full of highlights and memories, some quite amusing, others just awe inspiring. I can't speak for any of the others who I'm sure have a store of anecdotes from the night. Here are just a few of mine:

- I pointed out Sagitta to a couple of British lasses (one was a civil engineering student, the other in psychology), then loaned them my 12x50 binoculars. After they located the arrow's tail, I said to move the binoculars slightly left. 'Wow' was the immediate response – they had found the Coathanger.
- A delightful elderly lady had to use her walking stick while shakily looking at the Jewel Box. She insisted she couldn't see the red star at the centre. I kept on checking – it

was there all right. After about 10 tries, she gave up, saying "It must be my cataracts – I can't see the colour red."

- The number of meteors and fireballs. There was a regular chorus of 'didja see that?' and "Wow – that was bright."
- When we got down later to some serious personal viewing, I was reminded again of the fantastic treasure MAS has in Dick Everett. He casually announced "I've got 253." After I drooled over the image in his Dob, I said "If you can see that, so should I in mine... where is it?" Typical for Dick, he points at one star,  $\beta$  Cetus, then another on its right,  $\alpha$  Sculptorus, and says "move about 1/3<sup>rd</sup> the way from  $\alpha$  back towards  $\beta$  Cetus and you should see it. Try your binoculars first." And he was right. I saw this sliver of light exactly where he said. Then I trained my 9.25" scope on it and ...beautiful. A true near edge-on galaxy, NGC253, taking up the best part of my field of view. As if that wasn't enough, he then casually announces "There's a nice globular halfway back from 253 to  $\alpha$  Sculptorus." So I move my scope exactly half way back and... bingo, a delightful loose glob. And I could see this in my binoculars too. I later checked the charts and found this to be NGC 288. Thanks Dick.

What a night... way to go,  
Belanglo. RB



## What IC This Month

August 19 – Sept. 15, 2002

### Diary

Venus at its brightest meets Spica;  
Jupiter and the Beehive;  
Bright Uranus at opposition;  
Variable star Mira at maximum 3 mag.

### Moon

23/8 Full Moon  
31/8 Last Quarter  
7/9 New Moon (Dark)  
14/9 First Quarter

### Evening Sky Planets

**Mercury** will set between 7.15 and 7.45 pm this month. It will appear to hang in the sky before sliding back to the horizon for conjunction with the Sun. It will reach its highest on 1<sup>st</sup> Sep. This is the best time of the year for seeing 'The Speeding Merc'.

### Venus

Brighter than aircraft lights, far out classing Jupiter and brighter even than Sirius, Venus will be in Virgo all month, coming to its greatest brilliancy at end of September. On 1<sup>st</sup> – 4<sup>th</sup> Sep it will be about 30° above the western horizon near Spica and stay above Mercury till the 10<sup>th</sup>. Under dark skies Venus will cast your shadow on the ground. It sets about 9 pm.

**Uranus** is at opposition on 20<sup>th</sup> August and will be visible all evening. Located to the east of Deneb Algedi it is near the boundary with Aquarius. It remains in Capricornus till Jan 2003.

**Neptune** is also in Capricornus and at opposition. On 21<sup>st</sup> August it will be overcome by the bright full moon just 4.5° away.

**Saturn** rises between 1-2 am and will move into Orion after spending 2 years in Taurus. On 2<sup>nd</sup> September a slim last crescent moon will be less than 4° away

### Morning Planets

**Mars** rises just before the Sunrise and **Jupiter** will remain in the glare of Sol till mid-September.

There are no **Comets** brighter than 11<sup>th</sup> mag. this month

### Portraits in the Sky

On the far north horizon this month we find:

#### Cygnus - The Swan

One of the more obvious asterisms in our winter skies it is sometimes called the Northern Cross. The constellation is quite bright, with the stars being generally third and fourth magnitude.

Swans occur throughout Greek myths; often one of the gods transforms himself into a swan, usually to seduce some attractive nymph or woman. The swan commemorated

here isn't precisely known. It may be linked with Cygnus, son of Poseidon.

Cygnus had been left out on the seashore at birth to die. However, a swan took pity and flew down to care for the newborn child. Later he became the king of Colona, but he wasn't a particularly good king. He defended Troy against Achilles' attack and in their one-to-one struggle Achilles choked Cygnus to death. Poseidon grieved for his son and placed him in the sky as a swan.

Despite the myth, this constellation was known simply as "Ornis" (Bird) to the Greeks. It was the Romans who named it *Cygnus* after the Greek myth to explain its name.

The Arabs have seen the constellation as a hen, so most of the Arab star names relate to parts of a chook. The Arab word for 'hen' is 'Da ja jah'. So you could say that "methinks this um Jar Jar Binks ina sky big".

The tail of the swan is marked by **Alpha Cygni**, or **Deneb**, (meaning the Hen's Tail). Passing overhead on 1<sup>st</sup> August this is a supergiant, more than a hundred times the size of the Sun, with a very high luminosity. Since it is so far away (3200 light years) its real brilliance is lost in space.

**Gamma Cygni** is "Sadr", "The Hen's Breast". Between beta and gamma Cygni is the



Cygnus Star Cloud, a vast region of exceptional beauty.

**Epsilon Cygni** is "Gienah", meaning "The Wing".

The constellation has several superb visual binaries as well as several faint deep sky objects, but surprisingly, while the constellation lies in the heart of the Milky Way, it has no truly outstanding clusters, nebulae, or galaxies.

### Double Stars

**Beta Cygni** is called *Albireo*. This is a mistake for "ab ireo" as it was called by Ptolemy. The meaning for "ab ireo" is not known but the Arabs called it the Hen's Beak - "Al Minhar al Dajajah". This is a well known magnificently coloured double star. **Beta<sup>1</sup>** and **beta<sup>2</sup>** form a binary of extraordinary colour. AB: 3.1, 5.1; separation 34.3", are gold and blue (or perhaps yellow and blue-green). The component is quite wide, making it a popular object for binoculars.

**Delta Cygni** is a visual binary 2.9, 6.3; 2.5". with an orbit of 828 years.

**Mu Cygni** is another visual binary (4.8, 6.1, sep 1.85") with a long orbit of 789 years. For the next fifty years the separation will decrease (as seen from the earth).

**Tau Cygni** is a visual binary with a 49.9 year orbit: 3.9, 6.8, separation 0.8". Good collimation needed here!

**30 Cygni and 31 Cygni** [omicron<sup>1</sup>] form a wonderful triple, suitable for binoculars: AB: 4.0, 5.0; sep 338" (orange and turquoise). C: 7.0 mag. sep 107" (blue).

**61 Cygni** is another fine binary of two orange stars: 5.2, 6.0, separation 30.3". **61 Cygni** was the first star ever to have its parallax measured, in 1838 by Friedrich Wilhelm Bessel.

### Deep Sky Objects :

Cygnus contains two Messier objects and some faint and difficult nebulae:

**M29 (NGC 6913)** is an open cluster of about half a dozen eighth magnitude stars shaped like a square. The cluster is easily found 1.5° south of **Gamma Cygni** and a couple of arc minutes to the east.

**M39 (NGC 7092)** is a large and scattered group of faint (seventh magnitude) stars forming a rough triangle. It is 9° ENE of **Alpha Cygni**, but is curiously difficult to find due to its large size

**NCC 7000 - "The North American Nebula"** because of its shape, is a bright slightly greenish emission nebula. You'll find it is extremely faint, and is best seen in binoculars. Found between **alpha Cygni** and **xi Cygni**.

**The Veil Nebula West and East (NGC 6960 and NGC 6992/95)** are fine filaments seemingly suspended in the

cosmos. A large scope and perfect conditions with plenty of patience are needed to appreciate the delicate lines. 2.5 to 3° south of **epsilon Cygni**, the star **52 Cygni** is in the same field as the western segment and is the best starting point to search for it. **52 Cygni** is 3° due south of **epsilon Cygni** (also a binary, *Struve 2726*: 4.9; 6.6").

**Cygnus A** is the second brightest source in the 'radio sky'. This peculiarly-shaped galaxy is considered to be a billion light years distant, and is an object of intense investigation. Two lobes of radio emission are fed by jets of energetic particles from the galaxy core. **Cygnus A** is found in a highly nebulous region of the constellation, about 3.5° west of **Gamma Cyg**.

Looking higher in the sky and to the right from 'Ab Ireo' we come to the sky-pony.

**Equuleus- "The Little Horse"**, is one of the smallest constellations in the heavens, and also one of the most ancient. The "little horse" that the name refers to is lost in antiquity. Some sources believe it to be a half-brother of Pegasus. Originally named *Equus Primus*, "the First Horse", since it rises just before Pegasus, it is found about 8° southeast of **Delphinus**

It may have been founded by Ptolemy in the second century AD. However when creating



the Almagest he often borrowed from others and it is possible Hipparchus (146-127 BC) was the true creator of this constellation. Hipparchus composed the first star catalogue of about 850 stars. It is not known if he actually created any constellations, but he did discover the precession of the equinoxes and invented trigonometry.

The asterism is a faint triangular form made from the brightest four stars. The brightest of these, is called Kitalpha, from the Arabic "Part of the Horse". There are only a half dozen 5<sup>th</sup> magnitude Bayer stars with a number of binaries.

#### Double stars

**Gamma Equulei** (5 Equ) is a multiple system with quite faint components. AB: 4.7, 11; mags. separation 1.9", C is a 12<sup>th</sup> mag optical alignment at 47.7" separation and a D component is 6 mag. at 352" separation.

**Delta Equulei** (Struve 2777) is a multiple system with a rapid binary orbiting every 5.7 years: The two main stars separated by only 0.2" will need mirrors larger than 250 mm to split, but AC are easier 5.2, 9.4, with 47.7" separation.

**Epsilon Equulei** (Struve 2737) is also a multiple system. AB: 5.2, 6.0; 0.9" separation. C is 7.0 mag. and 10.6" separation.

**Lambda Equulei** (Struve 2742) is perhaps the most attractive binary in Equuleus. It has two equal but rather faint stars. 7.4, 7.4; separation 2.8".

Moving to the southern sky, we find the bright star Fomalhaut which is the main star in :-

**Piscis Austrinus – The Southern Fish** also known as Piscis Australis, a fish lying on its back, drinking in the waters pouring from the jars of Aquarius.

The constellation was known in ancient times, and is said to be the original "Pisces". The constellation may refer to the Assyrian fish god Dagon and the Babylonian god Oannes. Even the Arabs called the constellation The Large Southern Fish.

There are several fine binaries here, as well as a red dwarf. Most stars are 4<sup>th</sup> or 5<sup>th</sup> magnitude, except for :-

**Alpha PsA - Fomalhaut** meaning "The Fish's Mouth", is also known as 'The First Frog'. This is a 1<sup>st</sup> mag. A class white star, 16 times brighter than the Sun, and 25 light years away. Some northern observers call Fomalhaut 'The Lonely Star' because of its isolation just above the horizon in their autumn sky. It is surrounded by a disk of icy particles four times the size of our solar system with a hole in the middle. No planets have been detected, but one explanation

for holes like this is planet formation.

#### Double stars:

**Beta PsA** is a yellow and white double 4.5, 7.5; at 30.4" sep. **Delta PsA** is a faint binary: 4.5, 10; sep. 5", while **Gamma PsA** is about the same 4.5, 8.5; sep. 4.3". **Eta PsA** is getting into the expert observer class at 5.5, 6.5; sep. 1.6".

#### Deep Sky Objects:

**NGC 7172** is a 11.8 mag. spiral galaxy seen almost edge on. A dark equatorial band can be seen with larger scopes. The galaxy is 2° NW of **mu PsA**. Near the limit for my 20cm mirror in the same field, just to the south, lie three faint galaxies: 7173, 7174, and 7176 about 12<sup>th</sup> mag.

**Lacaille 9352** is a red dwarf 11.6 light years away, with a visual magnitude of 7.44. It is found 1° SE of **pi PsA**.

**NGC 7314** is 1.5° NE of Epsilon PsA. At 70 million ly distance it is thought to be an outlier of the Grus Cloud of Galaxies which also contains the Grus Quartet. The next trip to Belanglo should give good views of these, like last time.

Good seeing IC