# MACARTHUR ASTRONOMICAL SOCIETY Inc.

Journal



# **PRIME FOCUS**

# Volume 7 Issue 2

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President's Report

My apologies for not attending our meeting last month. Unfortunately I was laid low by a very nasty bug which saw me bedridden for a week. My ever reliable Vice President John Rombi stood in at the last minute and held court over the meeting. My thanks go to John and everyone who made the night a success.

I would especially like to thank Ian Cook who was the main speaker and Daniel Ross for bringing his new 12.5" truss telescope. This month Peter Druery returns with a bag full of the latest astronomical news and discoveries - should be great.

My timing for things astronomical is being effected by work and family commitments. Next months meeting will see me in Canberra for a regional conference and our Observatory Public night 23rd March will see me in Port Macquarie on a family holiday. Whilst I would have enjoyed attending the society's events, I am confident that John and the other committee members and supporters of the club will keep the ball rolling along quite nicely. In consultation with senior administration, my wife, it has been decided that as our newly acquired family situation has now settled down I should be able to attend most of the society events this year. Also as Carmen works on a Saturday those events that require me to get there earlier should not be a problem as I can call upon some baby sitters, so this year should be a bit easier for me.

The planning for our year ahead is now finalised and will revolve mainly around four key areas which will make up the bulk of the Society's activities.

#### **Public Open Nights**

In consultation with Ragbir we have decided to hold fewer Observatory nights this year. This will enable us to better manage our resources and promote the nights in a more consistent manner. Also this will allow us to factor in additional nights for The Oaks. This may help us counteract the weather by having an extra night at The Oaks to choose from. We will be printing some handouts to advertise the Observatory nights so we can distribute these to the public and build upon the crowd levels for those who are really keen for a return visit.

#### **International House Belanglo State Forest**

We will now be able to observe in very dark skies

every three months where we can stay over and make use of the facilities provided. This will be very exciting as we can camp over or go home if you choose. Being President I get the bed closest to the fire and of course first use of the shower ... I've got to get some perks of the job don't I? The first night is March 15<sup>th</sup>. I should have maps ready tonight so please ask for one. We request that this is for members only and is not for public knowledge or invitation due to contractual arrangements. The site is 74 kilometres and 45 minutes from the traffic lights at Narellan Road outside the University.

#### The Oaks Airfield

Our ever reliable general purpose site at the airfield will serve us well this year. It's for members only and some months will see us schedule additional nights. The sky can be quite dark at times and it's not a great distance to travel. It offers a very good horizon and is an ideal place to put your telescope through its paces

#### Monthly meetings

The room has been booked for the year ahead courtesy of Ragbir Bhathal and as a regular feature Peter Druery has agreed to continue with updates on the latest news and discoveries. Several members have suggested holding discussion groups within the meeting itself and this seems like a good idea. The chance to network and talk to members who hold the same astronomic interests can be a great way to learn more about this fantastic subject. We would appoint section leaders and topics could be around Cosmology, Astrophotography, Basic telescope use, Constellations and Double Stars and whatever else we think would be required. We are still developing our ideas around this and I will let you know when we are ready to go.

Well that's about it for this month. Don't forget that Membership Fees are due next month so your prompt payments would be most appreciated. Elsewhere in Prime Focus you will find the Society's schedule of events. Good luck with your stargazing and let's hope the weather will be kind.

Kind regards

Noel Sharpe

# **Telescope for sale**

Optex 6" Reflector. Equatorial mount with Polar scope and 2 eyepieces. 6 months old, bought \$1000 will sell for \$600.

Call Noel on 0410445041

# A Bunch of Dates

International House Dark Site - Belanglo State Forest

16/3/02; 08/6/02; 07/09/02; 07/12/02.

#### **Observatory Public Night**

23/03/02; 18/05/02; 15/06/02; 17/08/02; 12/10/02.

#### The Oaks

13/04/02; 20/04/02; 11/05/02; 06/07/02; 13/07/02; 10/08/02; 14/09/02; 05/10/02; 02/11/02; 09/11/02; 14/12/02.

#### **General Meetings**

18/03/02; 15/04/02 (AGM); 20/05/02; 17/06/02; 15/07/02; 19/08/02; 16/09/02; 21/10/02; 18/11/02.

#### At a Glance up to June.

16/03/02 Dark Site Belanglo
18/03/02 General Meeting
23/03/02 Obs. Public Night
13/04/02 The Oaks Airfield
15/04/02 AGM Meeting
20/04/02 The Oaks Airfield
11/05/02 The Oaks Airfield
18/05/02 Obs. Public Night
20/05/02 General Meeting
8/06/02 Dark Site Belanglo
15/06/02 Obs. Public Night
17/06/02 General Meeting

# What IC This Month

February 18 – March 17 2002

#### Diary

- 20/2 1<sup>st</sup> Q Moon 10.pm
  21/2 Saturn 2° Sth of Moon
  25/2 Merc 0.5° Sth Neptune
  1-10/3 Jupiter within 4° M35
  6/3 4<sup>th</sup> Q Moon
  10/3 Neptune 4° Nth Moon
  12/3 Uranus 4° Nth Moon
  18/3 Mars 4° Nth Moon
  22/3 Anniversary of
- discovery Uranus 221 years

#### **Did You Know?**

There really is cheese on the Moon? In the southwest quadrant very close to the large crater Shickard you can find a wafer-like crater called 'The Thin Cheese' or **Wargentin**. A circular crater that formed by impact and later filled to overflowing with hot lava during the Moon volcanic period. Now cooled it presents a smooth flat surface with some wrinkles similar to a circular round of cheese.

#### **Evening Sky Planets**

**Venus** rising in Pisces will be too close to the setting Sun until late February when it will appear as the Evening Star. On 15/3 small crescent Moon will appear just 3° from Venus in twilight.

**Mars** rises in Aries in the early evening. Well past its glory of last year it will set by 9 pm in the NW. See diary for Moon passes. **Saturn** appears in Taurus still close to Aldebaran. On 20/3 the minor planet Vesta will slide past Saturn within 0.1°. About 8.0 mag it will have the moon Titan between it and the planet.

#### Mid March

The planets Venus, Mars, Saturn and Jupiter will rise side-by-side in four different constellations - Pisces, Aries, Taurus and Gemini like pearls on a string.

Jupiter will continue in Gemini attracting all eyes because of its size and brightness. Very attractive with the Moon in the early evening when the moon is low and slightly yellow from atmosphere, try it on 23/2. See diary for other passes.

#### **Morning Sky**

Mercury will be at its greatest distance from the Sun till the end of Feb. The next 30 days will be best chance to view in a dark sky before the Sun comes up. 25/2 will provide a rare sight of Mercury and **Neptune** just 0.5° apart, in same field of view.

After spending 5 years in Capricornus **Urinus** is slowly moving on to Aquarius. On 9/3 it will pass by Mercury at 1.5°.

#### Meteors

The **Gamma Normids** appear over late Feb and March. Peak is on 8/3 about 5 zhr. 15% may leave trains. The **Virginids** originate near Spica from January to April. About 5 per hour, best seen after midnight.

# Comets

I am assured that **WM1** (Linear) is visible although it has been very misty and hard to view. It has not been the sight we hoped (what with smoke and clouds). By end of March it will have faded beyond the ability of most of us.

# Constellations of the Month: CANCER – The Crab

Cancer, the Crab, plays a minor role in the Twelve Labors of Hercules. While Hercules was busy fighting the multi-headed Hydra, the goddess Hera, who didn't like Hercules, sent the Crab to distract him. Cancer grabbed onto the hero's toe with its claws, but Hercules crushed the crab with his foot barely breaking the rhythm of his great battle with Hydra. In gratitude for the little crustacean's heroic but pitiful effort, Hera, gave it a place in the sky. The zone 23.5 deg north to the equator was known as the Tropic of Cancer in ancient times because Cancer was the location of the Summer Solstice in June.

The constellation looks like a large Y with the head of Hydra to the north of the open end. It is noted for the Beehive Cluster also called 'the manger', flanked with two donkeys Asellus Borealis and Asellus Australis.

 $\alpha$  Cnc (Acubens – The Claw) is a 4<sup>th</sup> mag white star on the right hand top of the Y. It has a 12<sup>th</sup> mag companion visible in 75mm scope. Just 2° to the left is M67 a faint cluster like a misty ellipse just visible in binoculars. Too much power here can make it almost disappear.

 $\beta$  Cnc is the brightest star in the constellation at 3.5 mag. on the left side of the Y nearest to Procyon.

In the middle where the arms of the Y meet is Praesepe, or the manger, also known as **M44** the Beehive Cluster. It is a swarm of 50 stars 6<sup>th</sup> mag and fainter visible as a misty patch to the naked eye. Best seen in binoculars it is three time the size of the full moon and is 520 ly away.

 $\gamma$  (Asellus Borealis) the northern donkey, is a white star while  $\delta$  the southern donkey is a yellow giant.

The bottom of the Y is  $\iota$  Cnc a yellow giant about 9° north of the Beehive. There is a blue-white companion just visible in binoculars.

 $10^{\circ}$  away to the left of  $\delta$  is  $\zeta$ , a binary double yellow mag 5-6. The binary can be split with 100mm and the brighter star of the duo can be divided into an equal double by larger scopes.

#### Lepus - The Hare

Is an ancient constellation representing a hare hiding at the feet of Orion the Hunter to escape being pursued across the sky by Canis Major, the hunter's dog. It has also been called The Giant Hunter's Chair. The Arabs saw the brightest four stars as camels drinking from the river Eridanus. The Egyptians saw the Boat of Osiris, and the Chinese saw a plain old Shed. Other cultures make a link with a Rabbit in the Moon. It is said that when the Eagle (Aquila) sets, then Lepus the Hare rises. Overshadowed by Orion it still has a few interesting sights.

 $\alpha$  (Arneb) is a yellow and grey double star, mag 3 and 9.  $\beta$  (Nihal) is a yellow giant. An attractive double pair for binoculars is  $\gamma$  yellow and redorange.

The stars  $\alpha$ ,  $\beta$  and  $\mu$  (The Camels) make an easily recognised trapezium. Binoculars and small scopes reveal the open cluster NGC **2017** about 2 deg from  $\alpha$ , has five stars from 6 - 10th mag. Two of the stars are close binaries and 150 mm will split them for a total of seven stars in all.

A trio of 5<sup>th</sup> mag stars  $\lambda$ ,  $\nu$  and  $\kappa$  south of Rigel and north of *mu Lep* are the hare's ears facing R Lepus

The beautiful *Hind's Crimson Star* or **R Lep** is a long-period carbon variable, deep red in colour. Described as like a 'drop of blood on black velvet' it ranges from 5 to 12 mag over 430 days. Small scopes show the colour well when it is bright. Starting with  $\alpha$  extend a line to  $\mu$  and beyond about 5° SW to find it.

M79 is a beautiful globular cluster at a quite unusual location in the sky: Most globulars are grouped around the Galactic center, but this is one of the few which are in the central stellar bulge of our Milky Way galaxy. It is little over 40,000 light years from us.



A good object but can be difficult for small telescopes and binoculars. In the same low power field you will find **Herschel 3752** a deep yellow double star.

Good seeing IC

#### **Good Viewing**

If you must watch TV, here's a good series: On **ABC** 9.30pm Tuesday: "The Big Picture: Space – (Subject)" with Sam Neil. On 12<sup>th</sup> Feb it was about Life, with great simulations of the Big Bang and supernovae. This week it's about ELE. Great stuff!

#### Vice President's Quickie

Well Murphy's law has been very active for the last five months, and especially since the beginning of the year. The old adage that if something can go wrong, it probably will has never sounded truer.

I can't remember when I had my scope out in earnest since the M.A.S. marathon last September. Between the cloud, then cloud and rain and finally the devastating bushfires, the stars have made very infrequent appearances in our skies.

Regardless of this, our members have been very busy with new additions to their armoury. One of our Committee members, Daniel Ross has updated to a 12.5" Truss Dobsonian and along with the jaw dropping selection of evepieces he has, we should be treated to spectacular views of anything astronomical. Daniel showed the members that were present at our January meeting, how to set up this instrument and how to collimate the optics. A funny moment occurred part of the way through the set-up, when just before attaching the truss tubes to the base, someone yelled out (was it you George) that the base looked like one of the thunder boxes of old. Look for yourself next time the chance arises.

Our intrepid Mr Gadget, Dick Everett has been tinkering in his workshop and come up with a clever heater and control box to help eliminate the dreaded fogged lenses. I have been one of Dick's first customers and the system works very well.

Well, it is the 7<sup>th</sup> of Feb, a few days before our first observation night at The Oaks this month, and as usual I can see that our nemeses, "Overcast and Foggo the Thick" are going to once again spoil our night. Eh!! Maybe we could study astrology instead.

On the weekend of March 16<sup>th</sup>-17<sup>th</sup> our society has permission to use International House's cabin in The Belangalo Forest, Berrima. This is very dark sky site so please make use of this occasion. We hope to be able to use this site four times this year. Information will be made

available tonight.

John Rombi.

# JOHN MICHEL -Father of Black Holes

Two hundred years before Einstein and 60 years after Newton an English clergyman accurately described black holes and how to find them in a paper to the Royal Society in London!

John Michel was born in Nottingham shire and graduated from Cambridge University in 1752. His study of the events that led to an earthquake that destroyed Lisbon in 1755 brought him fame for his conclusion that the cause was due to a shift in the earth's crust under the Atlantic Ocean. He is generally regarded today as the father of the science of Seismology. He was admitted to membership in the Royal Society in 1760 and was appointed Professor of Geology at Cambridge in 1762.

Just 50 years after Newton published his work most of science was pursuing and testing related theories. Michel was no exception, he was always interested in magnetism and gravity. One of his inventions was a torsion balance to measure very small gravitational forces.

In 1764 he was offered the rectorship of a parish at Thornhill, Yorkshire where he continued his research in geology and astronomy.

William Herschel was a frequent visitor in his house and in 1767 Michel produced a paper that proposed there were too many double stars in the sky to be a product of random chance visual alignment only. Many of them must be true binaries by a gravitational physical association also. He was the first person to calculate a realistic distance to nearby stars based on the apparent brightness of Vega. In the light of knowledge today, his calculation was 75% underestimated but at least it dealt with observable conclusions.

In 1783 at the age of 60 he wrote and submitted to the Royal Society a paper about how to measure the distance, size and mass of what he called 'dark stars' by measuring the gravitational effect on the light emitted.

Based on Newton's idea of light as particles, or corpuscles, and therefore subject to the forces of gravity like all else, Michel proposed that if a star was big enough, the speed of light would not be able to overcome the gravitational effect. Today this is called the 'escape velocity'.

One of many detailed arguments stated that if a star was 500 times larger than the Sun and light was unable to escape, we would get no information visually. However if there were other luminous bodies revolving around it we would be able to infer its existence by their behaviour.

A sphere 500 times the Sun would have the same diameter of the Solar System, very similar to the kind of black hole thought to be at the centre of quasars. His idea to locate dark stars in binary systems by the gravitational influence on the orbits of companions exactly describes the method used to identify Cygnus X1, the first black hole found in 1972, 189 years after John Michel's paper to the Royal Society.

Lacking sophisticated equipment of today and the worldwide sharing of information, the thinking power of these great scientists amazes me.

Ian Cook

# Astronomy on Wallis Lake (Forster) 2001-2002.

On the 28<sup>th</sup> December 2001 we were heading north and escaped the smoke of the bushfires around Sydney. We camped with our friends on their property at Wallis Lake and were lucky that there weren't any fires in the surrounding forest. On the 30<sup>th</sup> it was a very hot day and the following night was not any better.

We sat outside and watched the cloudy sky overhead: I knew there was a blue moon and a penumbral eclipse between 8.00pm and 10.30pm. We were lucky that the clouds cleared just after 10.30, but unfortunately the eclipse had just finished. The full moon was shining with Jupiter just 2° above it. Then the entire sky revealed itself with more and more stars becoming visible. The two most prominent objects were Saturn and Aldebaran in Taurus. In our backyard at home these two bright objects were unknown to me until I put the binoculars on them.

I took my telescope with me to Wallis Lake: this is where I showed my friends the spectacular rings of Saturn. We saw Orion and many other constellations on this wonderful blue moon night.

On the 31<sup>st</sup> we drove to Forster and met our friends' son and daughter in law and two children at the bowling club for New Years dinner. There was a brilliant electrical storm with rain, but we were lucky enough to see the fireworks at 9.30pm in the town centre.

On the way back to our campsite we saw the full moon being followed by the brilliant Jupiter. The clouds at the base of the moon were being lit by a spectacular lightning show. As midnight approached we celebrated with good food, drink, music and dancing with our friends.

On the 3<sup>rd</sup> January the sky was clear and full of stars, we were lucky because the previous days the sky was full of smoke from the fires near Karuah. I could see the Milky Way again. Orion was great and all the other constellations too. With Saturn, Taurus now has two bulls eyes - the bigger of the two is Aldebaran.

I saw The Pleiades and Jupiter through my telescope. Jupiter had three of its moons on its right side strung like pearls. Orion was too high in the sky for me to see with my scope, so I enjoyed the rest of the

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stars with my binoculars before I retired for the night.

Ursula Braatz.

# **Green Eyes**

I'd just about got over my attack of the 'green eyed lurgy' –which I picked up the night Daniel showed off his 12.5" weapon (there was a lot of it in the air that night) – and getting back to loving my own telescope (poor neglected thing with all these lousy cloudy nights) when I saw it.

'It' being an article in *Sky & Telescope* (February 2002) about an 18 years old amateur (well, what else could you be at only 18?) astronomer who won the amateur astronomers' 64 Million Dollar Prize: 2 hours observing time on one of the four 8.2 metre reflectors in the Very Large Telescope in Chile.

The lucky young lad was high school student Marcel Haas of the Netherlands. The prize was an arrangement between the VLT and the Dutch association of Meteorology and Astronomy for their 100<sup>th</sup> Anniversary. (When does ours come around? 2096? Damn.)

But he had to work for it. He had won the prize with his project proposal to study a nagging problem of planetary nebulae in globular clusters. The problem? They simply shouldn't exist, but four have been found – so far.

And here's the bit I love (and hate.) He got two cloudless hours, adaptive optics, assistance of a professional astronomer, probably tea and crumpets, the full monty. And after taking all his planned happy snaps of two of the planetaries through the 8.2 metre beast in visible and near ultra-violet wavelengths, his images were down loaded onto three CDs and packed with his toothbrush to study and analyse at leisure back in old Netherlands.

There were further details about Haas's happy adventure towards the end of the article but I couldn't read them – the green eyed lurgy had blurred my vision again.

Congratulations Marcel!

# To Be or Not to Be -One Metre of Rock

The events leading to the formation of planets are better understood following Hubble ST observations of the Orion Nebula. The nebula is believed to have created 10,000 or more low mass stars with the capacity to form planets from leftover material. Hubble has been observing some doughnut shaped protoplanetary disks of gas and dust around Theta Orionis, the hottest star in the region.

By measuring reflected light optically and with infrared, Hubble can determine that dust size particles in the disks are clumping together in sand and pebble size grains. A size of merely one metre is thought necessary to begin planet formation.

However the disks are being blasted by UV light and most are being blown apart and destroyed before material can reach a critical mass or size. If they can survive the battering UV radiation and quickly clump together and get to that one metre size, then they will probably go on to form planets around stars. If it turns out that planets form quickly, in less than 100,000 years, then they should be plentiful across the galaxy, but if it is a slow lingering process then the picture is more bleak.

Evidence so far supports the slower time version. Based on the 65 exosolar planets found so far, current estimates indicate only 5% of sun-like stars nearby have Jupiter size planets. Considering the millions of stars, that still leaves a large number of likely candidates.

Ian Cook

### Lord of the Ring

This is a most rewarding time of the year for star gazing, with a very crowded and interesting sky. What is very striking now is the so-called Summer Circle. (I assume we can call it that, I've only seen it referred to as the Winter Circle by North American articles.) This circle of bright stars (six of the 17 brightest) sets out an area of sky packed with astronomical interest, sweeping through a number of key constellations. It's fairly obvious once you've seen it, but unless it's pointed out to you, it's possible to miss the arrangement.

Go out any clear night (you remember those?) this month and look north. The first thing you will notice is Orion halfway up and just west of north. That's always worth a good look at anytime, with its Great Nebula and double stars. But for now we'll look for a distinct circle of 1<sup>st</sup> magnitude and brighter stars around it. Start down low in the northwest, near the horizon, and find Capella, a yellow star in Auriga. At mag 0.08, it's the 6<sup>th</sup> brightest star (not counting our Sun) and 45 l.y. away. It is a spectroscopic binary, two yellow giant stars with a period of 104 days.

Them moving clockwise, we go up to the reddish variable giant Aldebaran (from mag 0.75 to 0.95) in the Hyades in Taurus. It's the 13<sup>th</sup> brightest star and is only 68 l.y. away, so it's not really part of the Big V but a foreground star. The thing to notice at the moment is how Saturn is hanging around Hyades like a second Bull's Eye. It will continue in that general location until after Taurus has set after May.

Continue straight up to Rigel, to the west of the 'saucepan'.

Rigel (B Orionis) is a bluewhite supergiant, the 7<sup>th</sup> brightest star at mag 0.1 and 815 l.y. away. Its name means "giant's leg" or "ankle." (That's proof that we see Orion upside down.) We now move up and right to Sirius in Canis Major, the sky's brightest star at -1.47. Sirius is a very close neighbour, only 8.7 light years away. As a result, its absolute magnitude is less than what we see - only 1.4 mag. But that's still a lot brighter than our Sun which has an absolute magnitude of 4.8. That means that Sirius is a white star 23 times more luminous than old Sol.

Now come sharply down and slightly east to yellow-white Procyon in Canis Minor. At mag 0.34, it's the 8<sup>th</sup> brightest star, only 11 l.y. away. It has a white dwarf companion, but at mag 10.3 it's very difficult to see except in professional scopes. I always think that Canis Minor is a sorry excuse for a constellation. Two stars - that's it. But as a side-show to the circle, Procyon forms a very nice equilateral triangle with Betelgeuse and Sirius. Aren't you glad you paid attention to geometry at school?

Continue straight down to the yellow giant Pollux (with its Gemini twin Castor in tow). Pollux is mag 1.1 and the 17<sup>th</sup> brightest star, 35 l.y. away. Though Pollux gets the mention in the 'circle', it's actually Castor which is the more interesting star, being a complex multiple... a close

(but splittable) 4" binary of mags 1.9 and 2.9, each component itself a spectroscopic binary, and a wide mag 9 red dwarf companion 72" away, itself an Algol eclipsing binary. That makes a system of six.

To complete the circle, move down and west to return to Capella. Whew!

Admittedly it's more of an oval than a circle, but a round trip all the same, covering a fascinating part of the sky.

And what do we see right in the middle of this circle, blazing brightly with its four Galilean attendants? Yes, it's Jupiter, currently the brightest object in the sky at mag -2.5, lording it in the ring as Frodo the Hobbit, or maybe Gandalf the White. And the orange Betelgeuse, slinking into the ring with Jupiter. Is that the evil Sauron with his all-seeing red eye, or Smeagal still with blood on his hands?

Ah, Tolkien, isn't it great?

**Contributions to Prime** 

Focus are welcomed with open arms. Please add your experience to that of the 'regulars' so we all may grow in knowledge about our hobby. Talk to me over coffee at our meeting or star nights if you have an idea for an article. Remember, the more variety of authors, the better the read.

Bob Bee (Editor)