

# PRIME FOCUS

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## PRESIDENTS REPORT

ATTN; NEXT MONTH (MAY) WE ARE MEETING ON TUESDAY NIGHT. A once only to accommodate our guest speaker Ron Royal from the Sydney Observatory.

Hello and welcome for our third 1997 meeting at the University of Western Sydney, Macarthur Campus. Let me especially give a warm welcome to any new people attending tonight.

This Journal is packed full of very interesting articles, including highlights of Camp Constellation 2.

During the past few months MAS has been doing a number of talks for various societies and schools for which we have received hearty praise from these institutions.

Let me say a special thankyou to Noel for his workshop under very difficult personal circumstances at the camp; Eric, Peter, Noel obtaining star billing (excuse the pun).

### *President's Report (Cont'd)*

I would also like to thank all the other members for coming along and making the camp a great success, even though overall attendance was disappointing.

Finally who was that phantom photographer, a small impish figure went around snapping many an embarrassing photo--can see some of these in the article Camp Constellation 2.

Unfortunately we must advise that our treasurer, due to personal reasons, has decided to resign from his position and that of the committee. Many thanks must go to Robbie for his tireless effort in helping me start up the club.

Acting treasurer/s will be Noel and myself until a suitable replacement can be found. Our account was held at a credit union, but for easier access will be relocated at another Bank.

### **South Pacific Star Party--Ilford**

During the dates of May 9-12th, the Astronomical Society of NSW holds its annual Star Party. The cost is only \$35 for the chance to rub shoulders with some very astute astronomers. This year the guests include world renowned Supernova searcher Rev Bob Evans, Variable Star expert and 1996 Astronomy award winner Peter Williams and the world's most successful comet hunter Bill Bradfield. Many new facilities have been provided so see Eric or myself for details as bookings will close soon. If we have enough people interested for 1-2 nights we might be able to hire a mini-bus to take us up there.

### **LATEST NEWS**

#### **Mars Missions--March 5th Update.**

**1. Pathfinder---** The spacecraft is currently 37 million kms from Earth and is

working perfectly. It has travelled 248 million.kms so far which means that the spacecraft is halfway. They have carried out a set of tests for the craft on descending, landing communications etc; using the Deep space Network recorders at Goldstone.

**2. Global Surveyor--**March 7th--The spacecraft after some initial problems have shaken and tested every other component and all seem to be working properly. 120 days out 73.39 million kms from the Earth and 27.23million kms from Mars at a velocity of 27.23 km/sec, allowing all goes well it should reach Mars by September 12th 1997 and will start taking global pictures in Feb 98.

(More information can be found at the [www site Live From Mars.](http://www.site.Live.From.Mars.))

**Pioneer 10--** Launched 2nd March 1972 to study Jupiter and its overall size, shape and what it is made of has sent its last signal. NASA decided, with the ever increasing restraints and minimal scientific data they're now receiving, to say goodbye to the probe and let it speed off into the deep dark realms of interstellar space. Currently it is going at a speed of 44,000 kms/hr. In 30,000 years it will reach the next star system it is heading toward called Ross 248.

NASA pulled the plug as only 1 of 11 instruments was still working and would give up later this year. The faint signal from the furthest known probe man has ever sent has a message telling any civilization or alien race who we are, what we look like and where we are located. (Hope they're friendly).

#### **Hubble Mission - Shuttle Discovery (launched 11th Feb)**

Seven Astronauts successfully, after 2-3

*President's Report (Cont'd)*

days of 7 hour shifts doing EVAs, upgraded the Hubble telescope and gave it some newer equipment.

Firstly they replaced the Goddard High Resolution Spectrometer and the Faint Object Spectrograph with the Space Telescope Imaging Spectrograph (STIS) and the Near Infrared Multi-Object Spectrometer (NIMOS). The STIS separates light from distant sources and allows 30X and 500X more spatial data. The Hubble will be able to study Supermassive Blackholes and map the distribution of matter of the Universe. The NIMOS has three cameras and will see the very distant objects with the Infrared wavelengths (0.8-2.5 micrometres). The Hubble Space Telescope was also put 8kms higher in orbit, to raise it above the Earth's atmosphere as in the next few years the Sun is going to be at its most active and cause the Earth's atmosphere to heat and expand.

After a few months of calibrating the equipment we all hope to see what the amazing Hubble will show us next.

**MIR**

Space station update-- The astronauts have recently been plagued by bad luck as the oxygen and recycling equipment malfunctioned, then a fire broke out. It is believed all is now under control.

**Australia/Japan Unite--**

Japan has launched on their new M5 rocket a Radio Telescope and Australia and Japan are partners in this world first hardware in space. It links up with ground base dishes such as Tidbinbilla, and the Kagoshima space centre receives signals equivalent to a telescope 30,000 kms in diameter. That is, 3x larger than Earth and makes signals 1,000 x sharper than those of the Hubble telescope. Galaxies such as Centaurus A,

and Quasars will be viewed as never seen before. After some tests with the 830kg satellite/dish scientific data should start coming in by May this year. (I can't wait).

**COMING EVENTS****Talks--**

**Mon April 21st** --Yours Truly Phillip Ainsworth on the Solar System.

**20th May Tuesday Night** --- Ron Royal from Sudney Observatory will have a hands on talk about building telescopes and grinding mirrors.

**June 16th Mon.**--Jonathan Nally of Sky and Space will talk on the Mars Pathfinder as it will only be two weeks away from landing on Mars.

**July 21st - ATTENTION: International guest speaker Seth Shostak** of SETI in the USA will speak to us. He is one of the most interesting and entertaining speakers I have ever heard. A must - do not miss this event.

**Aug/Sep** Not confirmed speakers

**Mon 20th October** - Steve Manos on his trip to the USA and Space Camp.

**November** - not yet confirmed

**Dec--Christmas Picnic** Pembroke Park.  
1st Sunday in Dec. 7th (to be confirmed.)

**Other MAS Events**

**17th May--Camp Constellation 3** for those not attending Ilford.

Cherrybrook School --Talk and telescopes (not yet confirmed)

**July**--yes it's getting cold. Camp Constellation 4. Rug up for that one.

**July 26th MAS/SETI open Day/Night** (Guest speaker Seth Shostak of SETI.)

**Aug/Sept Macquarie night** - don't yet have dates.

Phil Ainsworth (President)



## From The Editor's Desk

\* It's been a fairly exciting month since the last issue of Prime Focus, with some fairly good dark clear skies for observing. The Southern Cross has been high, along with Orion and Cancer (spot the Beehive?)

Mars has been particularly spectacular, reaching its current nearest point to Earth (opposition) with a mag. -1.3 on 17th March. It would be 0.66 AU from Earth. This is the nearest it will be till April '99. Out of interest, it's closest opposition will be 0.37 AU in August 2003. No prizes for guessing who would be stuck to a telescope then, eh Phil? So did anyone get to observe the poles, or any surface markings? If so, please share it with us.

\* Camp Constellation 2, despite its disappointing low attendance, was a roaring success. (No, it wasn't the port). We know a few who were keen to come had last minute commitments preventing their attendance. It would be great, however, if more members could attend, even just for part of the evening, to enjoy this beautiful dark sky out at Carol's, and the friendly atmosphere. Why not try to make it next time? See the article on the Camp for more details of CC2.

\* I'm busy reading 'The First Three Minutes' by Steven Weinberg. Fascinating. Actually, it's for self defence. One of our members regularly asks me deeper and deeper questions about space-time and the Big Bang, and it's getting harder to keep one step ahead. It's moments like this that I wish I was one of the twelve people in the world who really understand Einstein's General Relativity. But then, if I was, I wouldn't be here writing this column. But I digress. After I've finished the book, I'll attempt to write a review of it. And maybe I'll be able to answer some of Michelle's questions.

\* And now for something different. A Mystery Galaxy of the Month. What well known galaxy, and in what constellation would it be found, is shown in the picture below? First person to tell me will get credit in the next issue. Thinking hats on you experts. Galaxy name and NGC number, please.



Photo by David Malin/AAT  
(Used by permission)

\* And a research question. Leo has six stars with names: Regulus, Denebola, Algieba, Zosma, Coxa, and Adhafera. Of the 88 constellations, which has the most stars with individual names? Is it Leo? Or some other? If you'd like to do the research, maybe you can share the answer with us in the next issue.

Good Seeing

Bob Bee ■



## The Learning Curve - Part 2

### Let's Explore the Universe:

With my trusty telescope now assembled, it was time to venture out into the observing field - my back yard - and put the scope through its paces. I read in the paper that Saturn would be in appearance in the western evening twilight. I wanted to get a really good view so I loaded my most powerful eyepiece into the focuser. I put the Barlow lens in as well, just for good measure. This gave me 450x of magnification.

I was confident that I would see wonderful sights. But what I saw was nothing but a few hazy undefined shapes that wobbled around like crazy. Where's Saturn? Must be that star over there. Again and again I searched. By this time I got to the swearing stage which drew the attention of my neighbours, who poked their heads over the fence and excitedly exclaimed: "Wow, what a big telescope, bet you can see a lot with that. I'll just grab the kids and come over." Oh, just what I needed.

### Who, What, Why and How Come!

The first thing you need is a plan on what you are going to observe. And, of course, the list should contain several objects. You just can't read in the paper that Saturn is setting or Jupiter is rising. I use a practical guide to the night sky: Astronomy 97. This is a great book and an essential tool to use. If I used it to look for Saturn, it would have told me the rise and set time, its magnitude (or brightness), where to look in the sky and what constellation it's in. It will even give me a map with its location in relation to the moon. That's good information and it works.

A very big mistake is to over power your telescope. Let's look at **magnification**.

How do you know your scope is operating at, say, 45x or 120x or 600x ? It's a simple formula but you must know the focal length of your scope. It's normally on the brand name plate attached, or in the instructions supplied. With the TASCO reflector used in this example, the focal length was 900mm. You divide this by the size of the eyepiece - say you selected a 4mm eyepiece. Divide into 900 and you get 225x. If the eyepiece is a 25mm, it would give you 36x magnification.

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...you need a plan on what you are going to observe...

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The **Barlow lens** increases the magnification when an eyepiece is inserted into the Barlow which is then inserted into the telescope focuser. With this example, it was a 2x Barlow.  
ie  $900 / 4 = 225$ ,  $x2 = 450x$ .

So far the mistakes were that I've completely over powered the scope and did not know exactly where to look for Saturn. Also, the finder scope was out of alignment. Let's look at finder scopes - your telescopes best friend.

**Finder Scopes.** Some finders can be focussed. This is important as you need clear sharp images in the finder, so adjust the focus. Use daylight to adjust and of course never look at the Sun. If you use your telescope to look at the Sun, you will cause extensive eye damage which will lead to permanent blindness. This is a serious warning: **Do not look at the Sun.**

To align your finder scope, choose, say, a light pole, a church steeple or other object a long distance away. I use some tables

*The Learning Curve - Part 2 (Cont'd)*

chairs on a reserve about 200 m from my house. Being daylight, it's easy to place the object in the telescope's field of view. Get it nicely centred and use strong magnification - I used 100x. Then look through the finder scope. Is the object in the cross hairs? If not, slightly unscrew the holding bracket, move the finder and adjust the screws to make it tight. All we are doing is making sure that what the finder sees, the scope will see.

So now that my finder scope is aligned and I know that Saturn is just left of the Moon and really bright, I will now place a 20mm eyepiece (without the Barlow) into the telescope. This gives me 45x.

What I now notice is a much brighter, clearer field of view with many stars present. Everything's in focus and I locate what I think is Saturn and place it right in the cross hairs of the finder scope. With great anticipation I now look through the telescope and - BINGO!! I can see rings. Absolutely fantastic! I jumped for joy, did a dance in the yard, grabbed all the neighbour's kids and said "Everyone, have a look at this." Awaiting the response of "Wow", what I got instead was: "Look at what? There's nothing there. This is boring, We're going home. Wait until I tell Dad."

I checked the scope myself and the kids were right. After all my hard work, it was gone. In a moment of reflection, I muttered under my breath: "Eppur si muove". And yet it moves.

More next issue.

Noel Sharpe

## Notice Board

\* The latest *Sky & Space* has a wonderful tribute to Dr Bobbie Vaille, who passed away on 13th November, 1996.

Dr Vaille was outstanding in her field and this obituary will give an insight into the life and times of one of Macarthur's most prominent and respected scientists.

This is a great article well written by Carol Oliver.

\*\*\*\*\*

\* If anyone knows of a property the Society can observe from, especially away from lights, please let Phil or Noel know. We need more venues to use for Star Nights.

\*\*\*\*\*

\* It's been pleasing to see more of our members taking up astrophotography. Keep up the good work. And don't forget - put some of your better shots in to Bob for inclusion in *Prime Focus*.

\*\*\*\*\*

\* The Society was well represented at the Astronomy Night organised by the Daystar Family Church. Three scopes were provided for viewing. Special thanks go to Eric, Noel, Peter and Terry.

\*\*\*\*\*

\* Next Camp Constellation will be on Saturday, 17th May.



## Camp Constellation - 2

The 2nd of your society's now bi-monthly Star Camps - called Camp Constellation by the Committee in an inspired moment of both promise and pretension - was held at Carol's place, south of Campbelltown on 15th March (or Star Date 1503.97 for the Trekkies).

A few of those present felt inspired to record their impressions of the camp. Here are their accounts. No names have been changed to protect the innocent. Candid photos are courtesy of Phil and Laura Ainsworth.

### As Seen by Bob Bee

\* The much threatened rain and clouds held off (at least until after mid-night). Bob's jinx reputation is officially broken. It had been a beautiful sunny day and the night sky promised to be clear and dark, once the 1st quarter moon had set at 11pm.

\* Like the true leader he is, Phil arrived first with his able assistant Laura. As a reward for such enthusiasm, he was able to set up his TASCO 114mm in the choice central position in Carol's backyard.

\* Bob arrived expecting to have a battle for a place to pitch his tent. But no, take your pick. And watch out for the electric fence.

\* Carol apologised profusely for not setting the chain saw onto the tall gum trees to the south of the field. We forgave her, but much later as Scorpius tried to rise, we cursed the trees. No matter, it whets our appetite for the May and July camps when Scorpius will be higher.

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**This record should show that Peter didn't lose his polar alignment that night...**

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\* Eventually, after Phil, Laura and Bob had enjoyed a tasty B-B-Q (Sausage Mignon and Oeufs Kilpatrick), Noel, Peter and Eric arrived. Tents were set up near the 'de-energised' electric fence. Then the scopes.

\* Noel erected his 200mm Meade Newtonian, then proceeded to polar align it using a truly bizarre technique which we should not try to describe here as this is a family Society and Journal.

\* Eric had his 200mm Meade CST up and aligned before you could say Annual Profit and Loss Statement. Our quiet achiever, is Eric.

\* Peter, our other jovial enthusiast, set up two scopes on different mounts. He wasn't going to miss anything that night. His 200mm Celestron was on an equatorial mount, complete with hand held alignment controller. This record should show that Peter didn't lose his polar alignment that night - or if he did, he wasn't telling.

His second scope was a (...*blessing on your head*...) Maksutov, set up on an alt-azimuth mount.

\* Yours truly, of course, had his faithful 12x50 binoculars. It's amazing, on a clear country sky, how much you can see with binoculars. Especially star clusters.

\* The 1st Quarter moon was high and, prior to the stars appearing, was a popular viewing object. The clarity of the craters, particularly on the terminator, was excellent. I was struck by some particular craters and later, at home, researched their names. Next time I'll take my Larousse Encyclopaedia of Astronomy with me, for

*Camp Constellation -2 (Cont'd)*

instant identification.

A particularly large dark 'crater' that caught my eye was Mare Serenitatis (a sea, not strictly a crater), with its tiny crater 'Bessel' just off centre, like an acne spot. Also, clearly defined with central shadows, were 'Eudoxes' and 'Aristoteles' below (ie to the North) of Serenitatis. You ask yourself, what's hiding in those dark circular shadows?

Then there were Menelaus and Manilus, just above the Mare S, stark 'bunkers' on the moonscape. Those stand out clearly in my memory. As I gazed up along the terminator towards the 'South Pole', the number of craters was overwhelming.

A great start to the night, and the first star had only just appeared.

\* More Society members arrived. Michelle with Alex. Kerry, the new girl on the block, with Greg and family, and Kerry's new 63mm Buchnell. Happy Christmas, Kerry. Lou, a new boy on the block, arrived with friends and his Vixen 4" refractor - very nice, Lou.

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**As the night wore on, some of the side shows were quite amusing:**

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\* Noel commenced his workshop/tutorial and soon discovered the folly of writing notes in red ink, for reading by red light. Good one, Noel. However, with hasty improvisation, lots of questions and answers and practical advice given, (Noel thought it gave a new meaning to the word 'interactive' - people going off on their own mini lessons), it was a commendable inaugural workshop. More of the same please, Noel. And use Black Ink!

# Then the serious business of star, nebular and constellation spotting began.

\* Kerry's 63mm Buchnell Christmas present was put to good use, with plenty of assistance from other members.

\* Bob was hooked on M44, the Beehive. It could actually be spotted in Cancer, between  $\gamma$  and  $\delta$ , with the naked eye. His binoculars showed M44 beautifully, and no-one could escape Bob pointing it out - not that they really minded (I hope!).

A bigger challenge was spotting M67 (a smaller denser cluster), near  $\alpha$  Cancri, in the binoculars. It wasn't until the moon had fully set that it could be seen with confidence. A faint smudge, but definitely M67. Funny thing, though, nobody turned a telescope on it. They were too busy looking at the myriad of other objects up for grabs.

# As the night wore on, some of the side shows were quite amusing:

\* Mars was bright and a popular viewing object. There was lively debate at one stage about its colour. Bob was insistent it 'wasn't red, more a yellowy orange.' Phil, our Marsophile, was adamant it was red.

\* As well as the normal 'shooting stars', there was one ripper of a meteorite. It burned all the way from high in the North to way over the Western horizon. Peter, who didn't see the actual meteorite, said he saw its fiery reflection on the trees, it was so bright. Mars Attack?

\* Michelle and Alex cornered Bob in a deep discussion on space-time. I don't think Alex was convinced, but with Bob's unique technique in cosmological explanations, with hand mimes galore (in the pitch dark), who can blame him?



*Camp Constellation -2 (Cont'd)*

\* There was great discussion around midnight about Spica. Someone with initials PA had a fixation about it being a special type of star but no-one could enlighten him. At last, under red light, Bob put Phil (whoops!) out of his misery with the following quotation from Collins Pocket Guide to the Stars and Planets: "Spica, in the constellation of Virgo, has a mass of about 11 Suns and a surface temp. of around 24,000°C. The lifetime of this intensely hot, luminous star is less than 1% of the lifetime of the Sun." We suggested to Phil that he hurry up and watch it before it snuffed out.

\* Clouds started to seriously move in about 1am, so the sleep overs formed a circle of deck chairs and broke out the port. Though discussions started deep and astronomic, they soon ascended to debates about which actor played which part (or alien) in Babylon 5. Good fun! When we looked up at 2.30am, the cloud cover was total, though Peter was insistent he could still pick Mars up though them. Bed time.

\* At breakfast, as a reward for not losing his alignment all night. Peter was supplied with a complete breakfast of French toast, tomato juice and a sausage - but no pancakes. Carol supplied the tea and coffee. A mini committee meeting ensued.

\* During the final packing up, to demonstrate how cruel some people can be, Bob was having trouble rolling up his collapsed tent. PA suggested it was because it was full of hot air. Really!

But overall, it had been a great camp. Roll on Camp Constellation 3 in May.

Bob Bee ■



## Phil's Recollections of CC2

My reflections of the second Camp Constellation are that it went off quite successfully. Here are the main points I got out of the night.

1. Viewing Mars in a variety of scopes and sharing eye pieces with Noel and seeing Omega Centauri in my scope for the first time (using Noel's eyepiece.)

2. The workshop was kept simple but warm and held by our very own Noel Sharpe.

3. The camera crew taking some hopefully memorable snaps to show others in the society who didn't or couldn't attend.

4. Always seeing many stars out and viewing the magnificent Sirius in my 114mm scope, distant galaxies and fuzzy dark patches only some of us could see (Pete & Eric).

5. The warm friendly atmosphere of the whole group, with the sharing of good stories and food amongst us all.

6. The BBQ, Pancakes, eggs, left over snags, and some very sleepy and dopy looking members wandering around camp looking very tired.

7. The late night Port and stories came out earlier than last camp as cloud came and destroyed any more viewing after about 12 midnight. I cannot wait for Camp Constellation 3 which will probably be in May for those who cannot make the journey to Ilford Star Party.

Phil Ainsworth ■

## Eric's Observations

At Camp Constellation 2, Eric Brown was a very busy boy with his Meade 200mm CST. Armed with his wickedly effective Sky Vector targeting device, located comfortably away from the noisy types, he made a leisurely tour of the ever darkening night sky's deep space objects.

The ever efficient accountant, he kept record of his observations on pro-forma sheets with date, object name, RA & Dec, mag, telescope, eyepiece, seeing conditions and copious comments. (Please note Noel - not written in red ink.) He even gave each observation a unique reference number, for future reference. (We could all learn from this practice. Why not design your own Observation Record Sheet? Failing that, you may wish to copy the sample sheet supplied in this issue. No copyright.)

The following is a reproduction of some of Eric's observations on 15th March. I can vouch for some of them because, as usual, Eric was enthusiastic in sharing his sightings with the others present. "Anyone for Sombrero Galaxy" is a classic Eric understatement.

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**...This washed out the nebula somewhat but made the Trapezium stand out very well.**

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For all these observations, Eric noted the 'seeing' as from Good to Excellent. xmm indicates the eyepiece size.

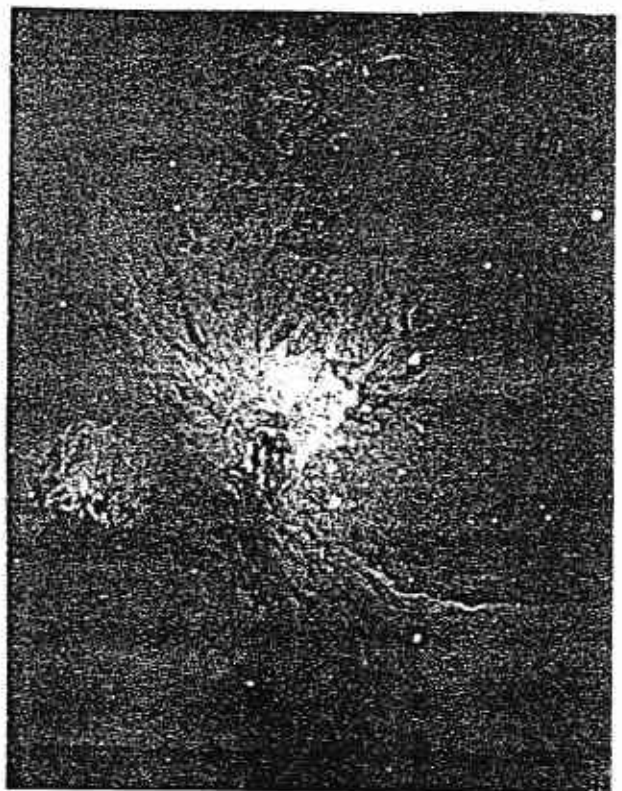
**Mars:** RA 11hrs, 50 min. Dec +49 deg. 6mm. Mars presented a medium sized disk but was unable to see the polar caps. However, using the 80A Wrather Filter, I was able to see a small cap on the N Pole.

**M35 & NGC2158:** RA 6 hrs 09 min. Dec 24.3 deg. 25mm. M35 is a large open cluster in Gemini. (Mag 5.1). Circular in

appearance with a loose circular arrangement of the stars within the cluster. Scanning West I stumbled on NGC2158 (Mag 8.6). This is a small faint open cluster which appears to be a large triangle placed on top of a smaller triangle. M35 cluster appears to be made up of stars that appear to be of similar magnitude.

**M79 - Lepus:** RA 5 hrs 24 min. Dec -24.5 deg. 12.5mm. (Mag 8.). A globular cluster, its outermost stars are resolved with a definite indication of granularity within the central concentration. Not a remarkable object in comparison to Omega Centauri. M79 is the only globular in this part of the sky (Lepus).

**M42 - Orion:** 40mm. Poor seeing as the moon was in 1st quarter with a bright sky. This washed out the nebula somewhat but made the Trapezium stand out very well.



Orion Nebula (M42)  
Photo by David Malin/AAI  
(Used by permission)

*Eric's Observations (cont'd)*

**R Leporis:** RA 5 hrs 00 min. Dec -14.8 deg. 25mm & 12.5mm. Designated as ST052 on the Sky Vector. Known as Hind's Crimson Star (after Englishman John Russell Hind who described it in 1845 as 'like a drop of blood on a black field' - Ed). This star is an example of a carbon star. There is a definite red colour to this star. Also must be variable in nature. (A Mira-type variable ranging from Mag 5.5 to 12 in around 430 days - Ed).

**NGC3115 -Sextans:** RA 1 hrs 05 min, Dec -7.7 deg. 25mm/12.5mm. Mag 8.9. An edge-on Spindle galaxy with a very bright central core. Even though it is a very small galaxy, use of a higher power makes this galaxy stand out due to better contrast against the sky background. \* Note: This galaxy is said to appear much the same in photos as it does in an amateur scope.

**NGC4699 & 4697 Virgo:** RA 12 hrs 49 min, Dec -8.7 & -5.8 deg resp. 25/12.5mm. Both of these galaxies are edge-on and look like small smudges in the sky. More magnification does not improve them greatly. Both are within 10deg of Spica and are on the tail end of the Virgo cluster. ie to the South. Both galaxies appear to be elongated with '97 showing more than '96. 4697 was mag 9.2, 4699 was mag 9.5.

**M104 - Sombrero Galaxy:** RA 12 hrs 40 min, dec -11.6 deg. Mag 8.0. 25/12.5mm. This is a magnificent object - my favourite galaxy! It has its upper and central bulge separated by a large seemingly circular dust lane. This object does well with further magnification making the sky background seem darker and accentuating the dark central dust lane. This edge-on galaxy is in Virgo, but not part of the Virgo cluster, lying closer about 35 million l.y. away.

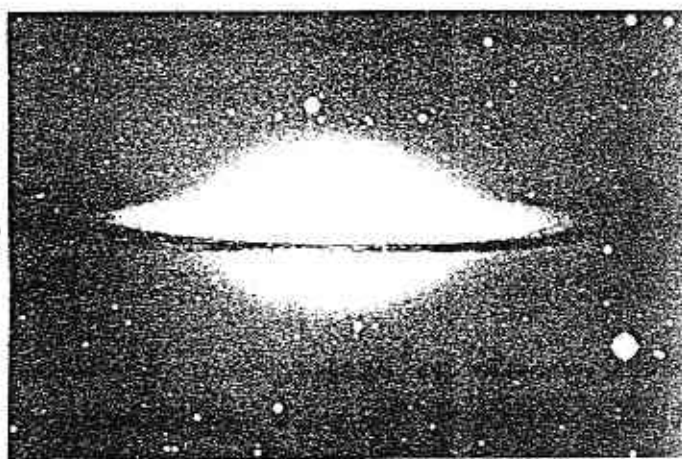


Photo by David Malin/AAT  
(Used by permission)

Well, I could be wrong, folks, but I think Eric had lots of fun at the Star Camp. And thanks for these observations Eric.  
Well Seen! (Bob Bee) ■



"I was sure this was the spot"



El Presidente



Pancakes, anyone?"

## Shooting The Moon

(or Some Observations By A Fellow Lunatic) by Peter Druery.

The Moon was probably one of the very first, if not the first, object that Galileo turned his telescope towards approximately four centuries ago. Even with his very crude instrument, plagued by just about every optical aberration known, he could still see a wealth of incredible features; craters, mountains, valleys, wrinkled walled plains, seas, and so on.

And so today anyone's first look at the Moon through even the most basic telescope will also be instantly rewarded by an amazingly detailed image of our nearest neighbour. The Moon is so close, and has the added advantage of having no atmosphere to cloud or distort our view (ignoring the effects of ours), so that it allows so many of its features to be easily visible, even through a relatively mediocre beginner's scope.

Unfortunately today telescopic lunar observation tends to be limited almost exclusively to introductory viewing and to 'putting on a show' for those who have perhaps never seen the wonders of the universe through a telescope. Don't get me wrong: this is a rewarding thing to do since the Moon is such a showpiece object. It is so near to us and yet it appears to be such an alien place. This often helps spark a great deal of interest from the general public in the activities of amateur astronomers.

However, I sometimes wonder if many of us miss out a little bit by not going out of our way to really get to know our nearest neighbour. Many astronomers see the Moon as somewhat of an inconvenience. We need dark skies to study many of the faint objects that demand the darkest possible sky background. And yet,

although I too crave the time of the month when the Moon has gone, thus allowing us a window of opportunity to view and photograph these deep-sky splendours, imagine how complacent we would get if this cycle did not occur. Those deep-sky objects are so much better having had to wait for them.

There is also another side to these lunar cycles and phases. When the Moon is around we have the perfect object to explore and inadvertently to hone our observation skills. Observing the Moon regularly is a great 'training project' in taking observations. I remember when I was quite young reading in one of the many books I borrowed from the local library, some advice by Patrick Moore, the distinguished and rather eccentric British amateur. Patrick's advice on how to improve your powers of observation was simple, but nevertheless, very effective. Get a lunar map (not too detailed) showing approx. 300 or so features - like the ones Rand-MacNally put out. You will also find a good one in *Norton's Star Atlas*. 'Take this map home,' he said, 'look through your telescope and view every one of the 300 features that are plotted.'

I remember following his advice - the object being essentially to make a duplicate of the lunar map with each crater plotted only *after* it had been observed. I think that this exercise, which from memory took me the best part of a year to complete, is a great training exercise, in that it teaches care and discipline at the eyepiece. It teaches you how to really see! I have found this invaluable when applied to other types of objects like those faint fuzzies - nebulae, star clusters, galaxies and the like. In addition, since each crater or feature has its own best observing time, it forces you to plan - a very useful skill when carrying out any sort of astronomical observation.



*Shooting the Moon (Cont'd)*

Apart from the actual drawings or sketches I can also remember taking brief but descriptive notes on each object. It pays to keep in mind the people who may want to study your drawings. Things like date and time, the mid-point time of your sketch, the type of eyepiece used, the type of telescope and the focal ratio, the field of view of the eyepiece, sky and atmospheric conditions, 'seeing' conditions, as well as general observations about what I saw. I found drawing 'at the eyepiece' to be a very demanding but enjoyable pastime and it wasn't until much later that I began to attempt to photograph the lunar surface. (By the way, here is one situation where using very high magnifications usually pays off - even in a mediocre, relatively small telescope.)

Now I find that I really enjoy not only photographing the Moon, but also attempting to redraw them at my leisure while comfortably seated at a desk with the aid of a very detailed lunar atlas and the benefit of unchanging lighting conditions. This fact is not often appreciated by the casual observer. That is, the terminator (the area where shadows are most pronounced due to the angle of the sun glancing the surface) moves quite quickly. In the course of an evening, the changes in details seen can be quite significant, and you really have to learn to draw very quickly.

But even today, lunar photography from Earth can never quite equal what the naked eye can discern through the same telescope. It is only under exceptional instances of near perfect seeing that photography can begin to come close. Hence, the very experienced observer can watch for those momentarily fleeting glances of perfect seeing that almost always occur during an observing session. It is at such times that the resolution of a

6" telescope can get to around two kilometres or so, and occasionally incredible detail can magically appear. Good things come to those who wait!

However, with proper attention to detail and good techniques, even small telescopes can yield terrific lunar photographs. The main concern is to be patient and to learn to take the photo so that it synchronises with the moments of exceptional seeing. Otherwise, the 1 to 2 second exposure typically required of such high resolution photography will be somewhat degraded by atmospheric turbulence.

The following are two photographs I recently took of what I think are perhaps two of the most interesting fields on the whole lunar surface. (The photocopying probably doesn't do them a great deal of justice.) Along with each I have sketched out the main details and given a brief description of each feature. I have also included some interesting information about each: who they were named after (a fascinating area in itself), the type of feature(s), diameters and heights.

The photos were taken on 'day 8' of the lunar cycle, and to me this is perhaps the most interesting night of a lunar month. This is a night for vast mountain ranges, craters and the straight wall. The Alps and Alpine Valley are visible and so is the Moon's finest range, the Apennines in all its glory. In addition some of the best known plains, Mare Imbrium and Mare Serenitatis are becoming prominent as the rising Sun exposes more and more of their surfaces.

Archimedes is also now in sunlight, forming a wonderful triangle with two other craters, Aristillus and Autolycus. Nearby we can see the Spitzbergen Mountains and we can also get our first good look at Plato for the month. Directly



*Shooting the Moon (Cont'd)*

south of this huge oval walled plain, whose dark floor is always easy to recognise, we can spot the peak of the large mountain Pico brightly illuminating the terminator.

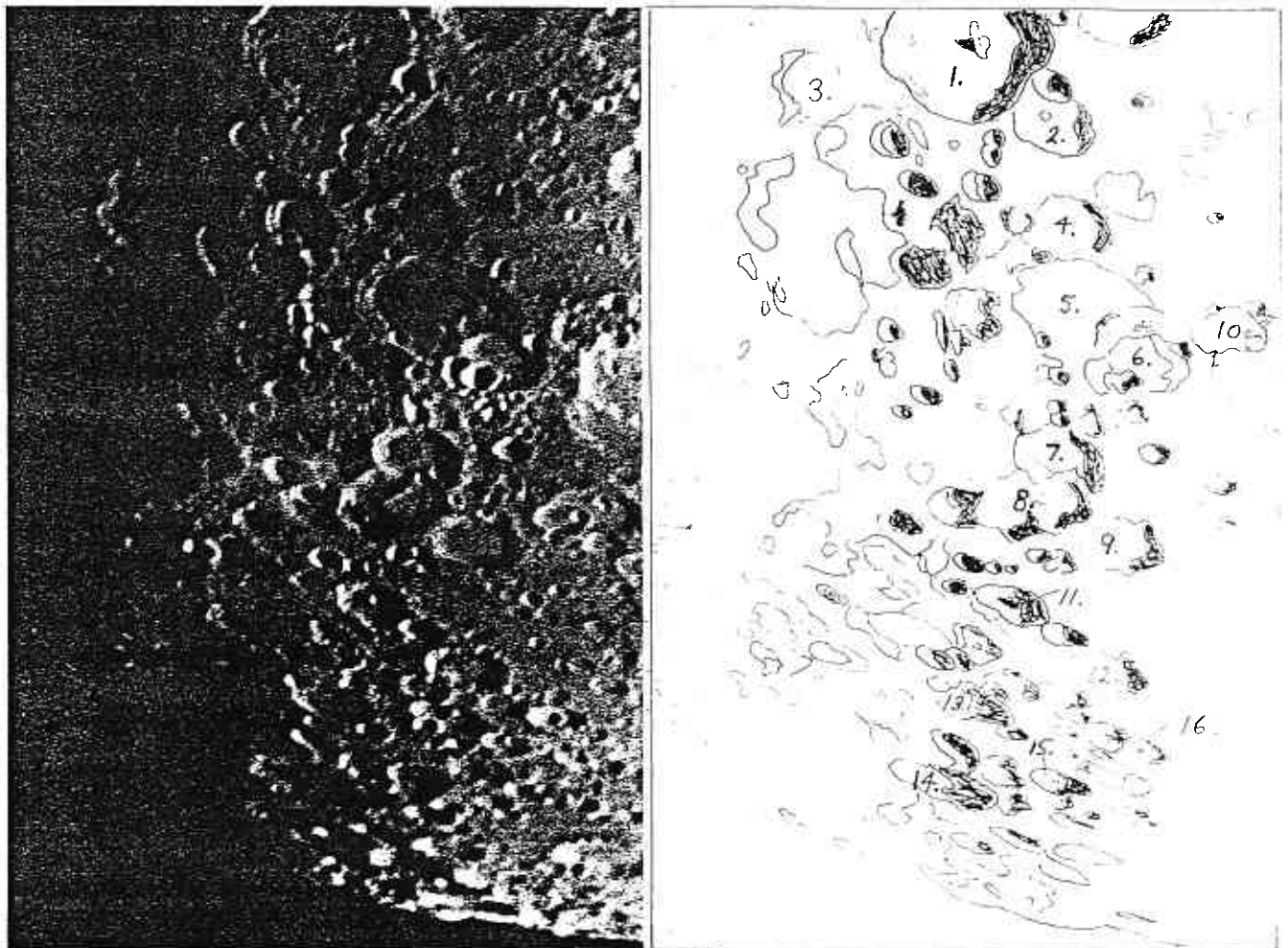
At this time you should be able to see Deslandres and Walter, a pair of craters whose features represent events a very different times in the geological history of the area. Deslandres is a very old walled plain whose eastern wall had been smashed into by the meteorite fall that formed Walter. On the eastern floor of Deslandres, close to Walter's wall, is a very strange brightening which was first seen by the 17th century astronomer Cassini and is now known as the Cassini bright spot. If

you find that it is not particularly visible wait another night or two and it will brighten considerably as the sun shines more strongly in the area.

So, why not have a go yourself, either at the eyepiece or at your leisure from a photograph. You'll be surprised how much you will quickly learn and it's a great fun-filled way to get to know the surface of our satellite, the Moon.

The photo below shows a very dense crater field in the vicinity of the prime meridian on the southern hemisphere of the moon. The lunar South Pole lies in the bottom right hand corner.

**Photo No.1**





*Shooting the Moon (Cont'd)*

The photograph was taken by the author using a 20cm Schmidt Cassegrain telescope working at F10, accurately polar aligned and tracking at normal Sidereal rate. Eyepiece projection was used with a 12.5mm orthoscopic eyepiece giving an effective focal length of F122. Fuji 'Sensia' 400ASA colour reversal (slide) film was used with an exposure of 2 seconds and the famous 'hat-trick'. The slide was then copied as a normal colour negative and printed.

**Legend and Details (Photo 1.)**

**1. Walter:** Named after Bernard Walter, 1430-1504. German Astronomer. This is a great *walled plain* approx. 132x140km. Its massive wall summits reach around 3500m and its central peak 4130m.

**2. Nonius:** Pedro Nunez, 1493 - 1577. Portuguese mathematician who devised an earlier type of vernier scale. This is known as a *disintegrated polygonal crater*. 70km in diameter and 2990m high wall summits.

**3. Lexell:** Anders J. Lexell, 1740 - 1784. Swedish mathematician and astronomer who worked in the area of celestial mechanics. Simply known as a *Crater*. 63km.

**4. Fernelius:** Jean Fernel, 1497-1558. French physicist. *Crater with a flooded floor*. 65km.

**5. Stofler:** Johann Stofler, 1452-1534. German mathematician, astronomer and astrologer. A *walled plain with a flooded floor*. 126km and 2760m in height.

**6. Faraday:** Michael Faraday, 1791-1867. English chemist and physicist, known for his discoveries in electricity and magnetism etc. *Crater*. 75km.

**7. Licetus:** Fortunio Liceti, 1577-1657. Italian physicist and philosopher. *Crater*. 75km.

**8. Heraclitus:** Greek philosopher of

Ephesus, 540 - 480 BC. *Ruined crater with a normal mountain range*. 90km.

**9. Cuvier:** Georges Cuvier, 1769-1832. French naturalist and palaeontologist. *Crater with a flooded floor*. 75km.

**10. Maurolycus:** Francesco Maurolico, 1494-1575. Italian mathematician, opposed the Copernican theory. *Vast walled plain with central peaks*. 114km and 4730m.

**11. Lilius:** Luigi Giglio, died 1576. Italian physicist and philosopher. He suggested that the Julian calendar be reformed. *Crater with central mountain*. 61km.

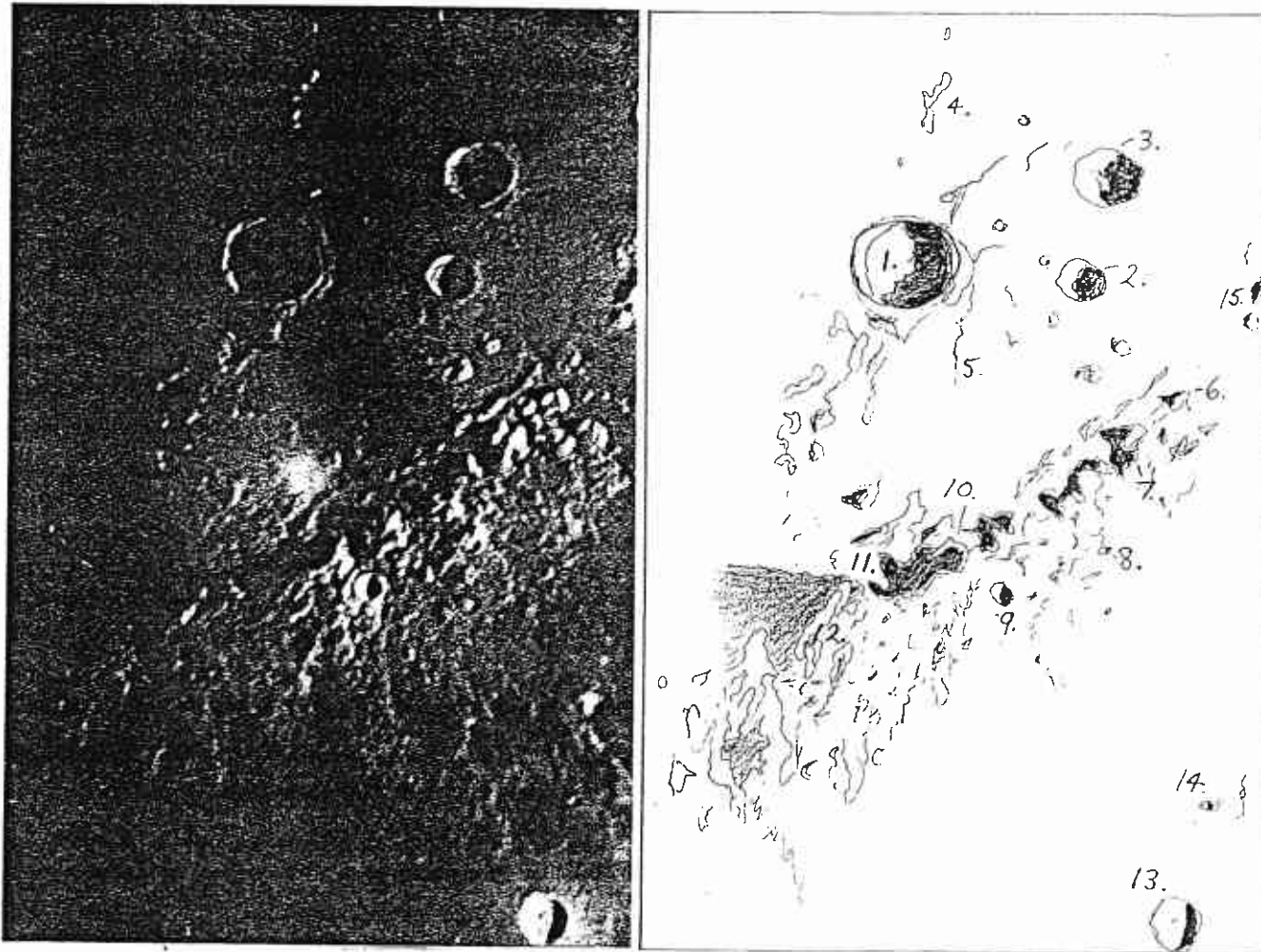
**12. Jacobi:** Karl G.J. Jacobi, 1804-1851. German mathematician and philosopher. Invented 'Jacobian Functions.' *Crater with a flooded floor*. 75km.

**13. Zach:** Franz X von Zach, 1754-1832. Hungarian astronomer. *Crater*. 71km.

**14. Curtius:** Albert Curtz, 1600-1671. German astronomer who published Tycho Brahe's observations. *Crater*. 56km.

**15. Pentland:** Joseph B. Pentland, 1797-1873. Irish politician and geographer. *Crater*. 56km.

**16. Kinau:** C.A. Kinau, died 1850. German botanist and selenographer. *Crater with a central peak*. 42km.

*Shooting the Moon (Cont'd)***Photo No.2**

The largest lunar mountain range, the Apennines, and the prominent crater Archimedes dominate this central northern part of the moon. It was at the foot of the Apennines, near the shadow of Mons Hadley, that the Apollo 15 expedition landed.

Observation of the area close to the pole is very difficult and some parts are constantly hidden behind hills and crater walls even when taking into account libration. This region is yet to be mapped in detail - the spacecraft 'Clementine' having recently concentrated on this area. The photograph was taken by the author using exactly the same technique, film and exposure as per the previous photo.

*Shooting the Moon (Cont'd)***Legend and Details (Photo 2.)**

**1. Archimedes:** Greek mathematician (c. 287-212 BC) and physicist of Syracuse. Discovered the principle of hydrostatic equilibrium. *Very prominent flooded crater with terraced walls.* It has an astonishingly smooth floor which is also very shallow compared to the surrounding terrain. It is filled with the same material as the 'seas' (mares). Its thick walls are 1300m high crowned by peaks reaching 2150m. 83km.

**2. Autolycus:** Greek astronomer (c.330 BC) and mathematician. *Crater with terraced walls and gaps in places.* 39km wall rising to 3430m above the crater bottom.

**3. Aristillus:** One of the earliest astronomers (c.280 BC) of the Greek school of Alexandria. *Prominent ray crater with a group of three 900m peaks on the floor.* This crater shows the characteristics of recent formation. ie sharp ridges, well defined terraces and traces of the explosion of the meteorite which caused the impact and the crater. Close inspection reveals radial grooves showing a furrowing of the surface. 55km and 3650m high wall.

**4. Spitzbergen Mts:** Named by M. Blagg because of its similarity to the terrestrial Spitzbergen Mountains. *A 60km chain of mountains reaching a height of 1500m.*

**5. Palus Putridinus:** (Marsh of Decay). Named by Riccoli. 180km.

**6. Cape Fresnel:** Augustin J. Fresnel, 1788-1743. French physicist who contributed much to optics. *This is the very northern promontory of the Apennines.*

**7. Mons Hadley:** John Hadley, 1682-1743. English pioneer of the reflecting telescope.

*A mountain massif in the northern part of the Apennines. 25km in length and 4800m high.*

*The Apennines form part of the wall of Mare Imbrium into which they descend relatively steeply (approx. A 30° slope). The slopes of the Apennines towards Mare Vaporum (at the bottom of the photo) are gradual. The height of some peaks exceeds 5000m while the length of the range is around 600km. It was at the base of Mons Hadley (Hadley Delta) that Apollo 15 landed.*

**8. Aratus:** Popular Greek poet (c. 315-245 BC) He was the author of the oldest description of the 48 ancient constellations. *Crater.* 10.6km, 1860m high.

**9. Conon:** (Not the Barbarian!) Conon, c. 260 BC. Greek mathematician and astronomer - friend of Archimedes. *Prominent small crater with a very defined, sharp rim.* 22km and 2320m in height.

**10. Mons Bradley:** James Bradley, 1692-1762. English astronomer - discovered the aberration of starlight and effect known as nutation. *This is a mountain massif close to Conon.* 30km in length.

**11. Mons Huygens:** Christiaan Huygens, 1629-1695. Dutch optician and astronomer. The first to recognise the true identity of Saturn's rings. *Mountain massif in the central part of the Apennines.* 40km in length and 5400m high.

**12. Mons Ampere:** Andre M. Ampere, 1775-1836. French physicist. The unit of electric current expressed using his name. *Mountain massif in the central part of the Apennines.* 30km long and 3000m high.

*Shooting the Moon (Cont'd)*

**13. Manilius:** Roman poet (c. 100BC) and author of the poem *Astronomicon*, which contains a description of the well known constellations. *Very prominent crater with terraces and some central peaks.* 39km and 3050m in height.

**14. Sulpicius Gallus:** Roman Consul (c. 168 BC), orator and scholar. Foretold of a lunar eclipse on the eve of the battle of Pydna, Macedonia. *Circular crater with a sharp rim.* 12.2km and 2160m high.

**15. Caucasus:** The Caucasian Mountains. *Named by Madler, is really a continuation of the Apennines.* However, the Caucasus are separated by a 50km wide 'strait' between Mare Imbrium and Mare Serenitatis. The peaks of the Caucasus

reach a height of around 6000m and if you were to stand on top of one of those peaks your horizon would extend to a distance of around 110km.

**P.S. Two publications I can highly recommend, particularly if you are very interested in lunar observing:**

RUKL; Antonin (ed.) 1992.

Atlas of the Moon. Aventinum, Prague. USA Kalmbach Publishing.

LEVY; David H. (1993).

The Sky (a user's guide). Great Britain. Cambridge University Press.

Peter Druery

### What to See in April/May

\* **Mars** can be seen high in the northern evening sky. It is slowly receding from us, so its mag. will reduce from -0.8 on 15th April to -0.1 on 15th May.

\* **Jupiter** is approaching opposition in about 4 months, so it will be getting brighter and larger. On 15th April, it was mag. -2.1 and will be mag. -2.3 on 15th May. Its rising time is progressing from 12.45am (21 April) to 11.15pm (15 May), so it's for keen morning astronomers only.

\* **Saturn** is rising just before twilight, mag. 0.7. You'll have to get up early to catch it.

\* **The New Moon** is on 7th May. A good night for viewing those fainter objects.

\* **Comet Hale-Bopp:** With a western horizon away from light pollution and obstructions, you may (if you're lucky) be able to spot this comet before it sets about

6.45pm, 1 hour after sunset. At the start of May it will be in Taurus (about 2 mag.) and will move into Orion by the end of May (about 3 mag.). April and May will be the latest when evening viewing (just after sunset) is possible. In later months, it will be 'early to rise' time if you want to see it in the morning before sunrise, and it will be getting fainter (4th mag) in July.

\* See 'Constellation of the Month' for Leo and Hydra details.

\* **Southern Cross and Centaurus:** Tantalisingly high in the sky all April and May for evening viewing. See Vol 1 No. 5 and No.6 for details.

\* For further tit-bits of what to look at, check both your Star-Wheel and your copy of Astronomy 1997.

Bob Bee



## FRONT YARD ASTRONOMER

### Starry Starry Light/It's Cloudy Tonight

Yes, your President has had his Telescope out viewing the heavens. It was on advice from our editor Bob Bee that Mars was only 94 million km away, its closest approach till 1999. So I took his advice. Although he suggested 4.am I got my scope out at 8.30 pm the previous night and decided that Mars at 93.5 million miles would be close enough.

After a very very rough polar alignment, I pointed my scope at the brightest red object in the sky (Mars) and for a good 45 minutes studied the little Red planet.

Firstly I started out with a 25mm eye piece for my 114mm reflector and saw a tiny red disk which showed me very little of its surface. I gradually increased eye piece power and gradually started I thought to see a very small white patch at the bottom of my scope. Realising that my image is inverted I studied it for 20 mins and decided I had seen the Northern Polar cap using 12mm eye piece.

Unfortunately many factors ruined any possibility of a very clear view as Mars was still quite low and the atmosphere was hazy, not to mention Mars at present is in

Spring in the Northern hemisphere and possibly starting their dust storm season which envelops the whole planet. After 40-45 minutes of realising I would see no more detail of Mars I focused my attention on the 3/4 Moon which just about blotted out any good viewing of other unique sights in the night sky. During my ½ hour at studying the surface of the Moon and having my Mum quiz me at what craters she was seeing I pointed my scope toward Sirius (the Dog Star), a white hot star which shines incredibly bright at about -1.5 magnitude. After only 10 minutes I was rapidly engulfed in heavy cloud cover and hurriedly put my telescope away for fear of a storm.

Just as I bedded down that night I peered out the window and noticed the clouds starting to break up and the sky was almost clear in 10 minutes. Wearily I went to bed. 4am and I dragged my weary body out of bed to notice a semi-clear sky. Pointing my 7x50 binoculars out the door I espied Mars. Seeing it was not ideal viewing conditions with cloud coming and going, I bid a hasty retreat back to my bed.

Phil Ainsworth

## APOLLO 7

Astronauts Walter M.Schirra, Don F.Eisele and Walter Channing proved to the world that man could take more than one person into space at a time and bring them back safely. On top of the huge Saturn rocket the command module sat with three astronauts eagerly awaiting the launch.

Finally on October 11th 1968 the huge beast launched up through the Earth's atmosphere and into the dark realms of space and into a stable orbit around Earth.

The Command Module which had the three men aboard orbited the Earth at 227kms above and reached apogee of 285 kms. It made a total of 163 orbits until it finally splashed down on October 22nd 1968 after 11 days in space.

During their time up in the CM they took a television camera and filmed themselves working and playing in space. Later they held up a sign which read, "Hello from the lovely room, high atop everything." Also during their filming they took some unbelievable footage of the Earth in space

*Apollo 7*

and us people down below stared in bewildered wonderment at the magnificent sight our own planet looks from space.

The most important factor from the mission was the rendezvous and docking with the third but dormant stage of the Saturn Rocket while they were orbiting around the Earth at thousands of kilometres per hour.

After this success mission Apollo 8 reached greater heights. This will be told in the next issue of The Journal.  
(Apollo overview & 1-6 missions in previous issue (March 1997))

Phil Ainsworth ■

## **Come, See and Meet the Stars**

And that is exactly what I did last month during my North Western NSW holiday. (Yes, these stars were real.)

My trip included visiting Dubbo Zoo, Dubbo Gaol (well, I actually escaped) and one of the 'star' attractions was going to Skywatch Observatory, located 2km out of 'down-town' Coonabarabran. Skywatch Observatory has an astronomy display including 'hands-on' computers, murals, microscopes etc. There is also a gift shop, a theatrette and a planetarium and slide show which would be ideal if the sky is not very clear or if you are visiting during the day.

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**... it is a beautiful, exciting and magical place and it is certainly worth a visit.**

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The Skywatch Observatory has other small telescopes and a 'night vision' scope so everything looks green when you view through it. (Little green men from Mars?)

Our 'Star Guide' was Peter Nielson who provided us with an entertaining, interesting and informative sky watch session. We viewed through the 12.5" Newtonian telescope which is housed in a geodesic dome and holds up to 30 people. Objects we viewed included: Mars, Eta Carina, Rigel, Tarantula Nebula, 47 Tucanae (my favourite), Betelgeuse, NGC5128 and lots more.

For those who have not been to Skywatch Observatory (or Coonabarabran for that matter) it is a beautiful, exciting and magical place and it is certainly worth a visit.

I also visited the Narrabri Radio Telescope (26 km from Narrabri) and the Parkes Radio Telescope (23km from Parkes). I thought the Narrabri Telescope more impressive than Parkes as there is more to offer and see. The 6x23m dishes at Narrabri had a greater impact on me than the single large dish at Parkes. However, the Parkes telescope plays a significant role in the SETI project and NASA occupies 10 hours a day of its viewing time for the Hubble Space Program.

To find out more about the Australia Telescope, I have donated a book to the Society which is very interesting reading. Just ask Phil Ainsworth if you are interested.

Well, that's about it from me, and may you reach for the stars!!

Sharryn-Ann McConkey ■





## This Month's Constellations (by Bob Bee)

From the latitude of Sydney, it's never really a great time to view Leo, because it's relatively low in the northern sky, competing with the city glow or a row of tall trees. Might I suggest, however, that for the 'civilized' hours of viewing (ie 8 - 10pm) April is about as good as it gets. Leo will be roughly North and about  $45^\circ$  above the horizon.

For similar reasons, Hydra, being such an inconsiderately long constellation (about  $100^\circ$  long), April is the only month when its head and tail and everything in between are at observable heights above the horizon.

For that reason, in this issue of Prime Focus, we are having a focus on two constellations. But don't get used to it - I'm not making a habit of it.

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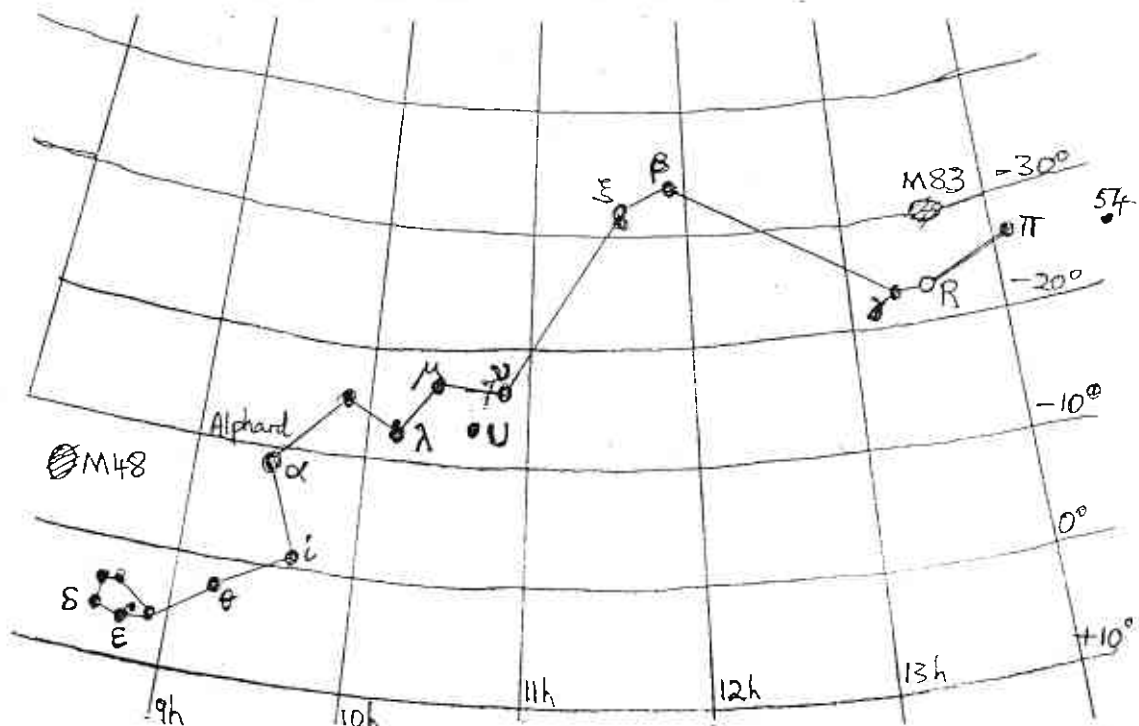
### Hydra - The Water Snake

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In Greek legend, Hydra was a gigantic monster with nine heads, the centre one being immortal. The destruction of Hydra was one of the 12 labours of Heracles (or Hercules). However, in this starry version of the myth, Hydra has only one head and is demoted to a water snake. (Remember, Cancer the Crab nipped Hercules on the foot while he was fighting Hydra? Bit by bit, the sky is becoming a montage of mythological tales. Stay tuned for more.)

Hydra is not very easy to identify, mostly because its component stars are relatively

faint. With the exception of Alpha Hydrae, the others range from mags 3 to 5. However, the head is quite distinct and attractive. The six stars are easily recognisable in a kind of five sided polygon. They are located immediately above the constellation of Cancer (see Issue 2). From the head, on a clear dark night, with the help of a star map, it is fun to try and trace the snake to its tail,  $100^\circ$  away across the sky. The head starts at RA 8.5 hr, dec  $+5^\circ$ , and the tail ends at RA 14 hr, dec  $-26^\circ$ . But in April, around 9pm, you should be able to see it all.



*Constellations (cont'd)*

Let's look at some of Hydra's main components. Overall, there are about 13 stars which make up its body, and six in the head. Naturally, there are many more stars and objects which fall in the area of sky associated with Hydra.

**$\alpha$  (Alpha) Hydrae** - one of those stars with a name - 'Alphard' (the Solitary One). It is an orange giant, mag 2.0, about 65 l.y. away (RA 9h 28m,  $-9^\circ$ ).

**$\beta$  (Beta) Hydrae** - about 1/3rd from the tail end. An ordinary blue-white star, mag 4.3, about 330 l.y. away.

**$\gamma$  (Gamma) Hydrae** - down near the tail end. A yellow giant, mag 3.0, 100 l.y.

**$\delta$  (Delta) Hydrae** - in the head. A Blue-white star, mag 4.2, about 150 l.y.

**$\epsilon$  (Epsilon) Hydrae** - also in the head, next to  $\delta$ . It's a double, 250 l.y. away with contrasting colours of yellow and blue, mags 3.4 and 6.8. (A double in more ways than one - ha ha!). The pair orbit each other every 900 years. To resolve them, you'll need a telescope of at least 75mm and apply high power. (RA 8h 47m,  $+6^\circ$ ).

**R Hydrae** - to the right of  $\gamma$  at RA 13h 30m,  $-23^\circ$ , is a Mira type variable, a giant red, that varies between mags 3 and 11 every 390 days.

Now, a couple of stars off the snake's body are also interesting.

**U Hydrae** - just to the right of  $\lambda$ , an irregularly fluctuating deep red variable from mags 4.3 to 6.5. (RA 10h 38m,  $-13^\circ$ ).

**54 Hydrae** - beyond the tails end (as shown) is a pretty double resolvable by small telescopes. It's yellow and purple

stars are mags 4.9 and 7.2.

Inevitably, we come to the galaxies and clusters (I sometimes think that NGC really stands for 'nebula, galaxy or cluster').

**M48 (NGC2548)**. On a clear dark night, this large cluster of about 80 stars is just visible to the naked eye. Even better in binoculars or a low powered telescope. Approx. triangular in shape. (RA 8h 14m,  $6^\circ$ , 2000 l.y.)

**M83 (NGC5236)**. This is a beautiful 'in-your-face' spiral galaxy. (See photo). At 8th mag, it's visible in a small telescope and has a bright central nucleus. Those of you with apertures of 150mm or more, see if you can trace the spiral arms. You should be able to. This is what our Milky Way probably looks like from 10 million l.y. (RA 13h 37m,  $-30^\circ$ ).



M83 - photo by David Malin/AAT  
(Used by permission)

*Constellations (cont'd)*

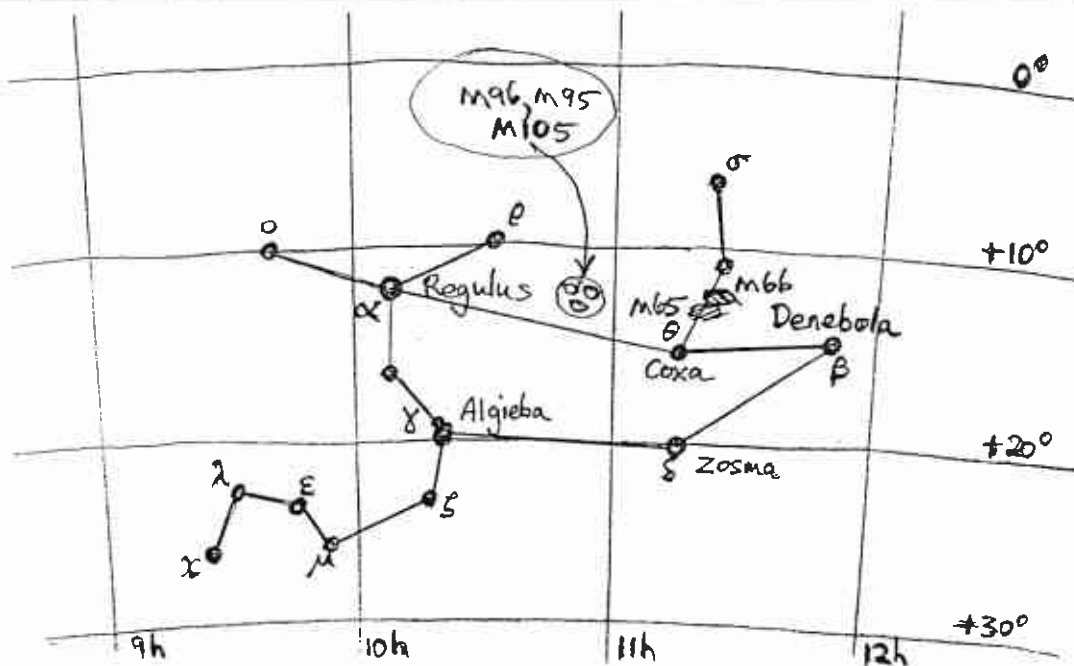
**M68 (NGC4590).** A globular cluster at RA 12h 39m,  $-26.5^\circ$ . Could someone please observe this and give me more details, eg visibility, denseness, size of instrument needed to observe it etc.

**NGC3242.** Dubbed 'The Ghost of Jupiter', this is a planetary nebula, 9th mag, of a similar apparent size of Jupiter's disk. 2,600 l.y away, it can be spotted in small telescopes at low mag, looking like a blue-green disk. If you have a larger scope, you should be able to see it as a bright inner disk with a fainter halo. Can any member observe this? (RA 10h 25m,  $-19^\circ$ ).

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**Leo - The Lion**


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Thank goodness - a constellation that's instantly recognisable as what it's supposed to be - if you're standing on your head, in Australia. (Hold the diagram above upside down and you'll see what I mean). Yes, a crouching lion. Another poor victim of the labouring Hercules - his first, I believe.

This constellation is immediately spotted in the north sky, usually low from Sydney, because of the characteristic 'sickle' shape, which represents the lion's head and mane.

Leo is a feast of interesting stars and objects, including a number of Messier

objects for amateur scopes and binoculars. So be prepared to study this article and go out on a good night and see how many 'scalps' you can take. It was obviously popular with the ancient astronomers as they gave so many of its stars individual names. (It got the lion's share? Sorry!)

**α (Alpha) Leonis.** A good trig point for eye ball star hopping. Regulus, 'The Little King' is a blue-white star, mag 1.4 about 90 l.y. away. Small scopes or binoculars may resolve a mag 7.7 wide companion (the little queen?). (RA 10h 8m,  $+12^\circ$ )

*Constellations (cont'd)*

**$\beta$  (Beta) Leonis** is the lion's tail, Denebola. At mag 2.1, this white star is only 42 l.y. away. (RA 11h 49m, +15°).

**$\gamma$  (Gamma) Leonis** is 'the lion's forehead', Algieba. (Personally, I think it's a funny place for a forehead. It looks more like the base of its neck to me.) This is an excellent double for small scopes, revealing a pair of golden yellow giants of mags 2.2 and 3.5, with a 600 year orbital period. Binoculars should pick up 40 Leonis nearby, an unrelated mag 4.8 yellow star.  $\gamma$  is RA 10 h 20m, +20°.

**$\delta$  (Delta) Leonis.** Zosma (its rump?). A blue-white mag 2.6 star, 46 l.y. (RA 11h 14m, +21°).

**$\zeta$  (Zeta) Leonis.** Adhafera is part of the 'sickle'. It makes an optical triple. Binoculars will reveal a 3.4 mag giant white star with an unrelated background orange star (mag 5.9) nearby. Add to this another (wider) mag 5.8 star, also visible in binoculars. (RA 10h 17m, +23°).

**54 Leonis.** See if your small scopes (and those not so small) can resolve this double into its blue white components of mags 4.5 and 6.3. (RA 10h 56m, +25°).

**R Leonis** is another of those Mira type variable red giants, fluctuating between mags 6 and 10 over 312 days. To be ornery, it will sometimes flare to mag 4.4. (RA 9h 48m, +11°).

Now we come to the M objects. (Aren't we lucky Fourier wasn't an astronomer?)

**M65 & M66 (NGC3623 & NGC3627):** These are easy targets for large binoculars and smaller telescopes in dark skies. However, to really appreciate their central bulges and elongated shapes, 100mm or more is needed. The two 9th mag spiral

galaxies, about 20 million l.y. away, are in fact interacting with each other and a third galaxy NGC3628 (seen edge on in photo). (RA 11h 19m, +13°) ↓

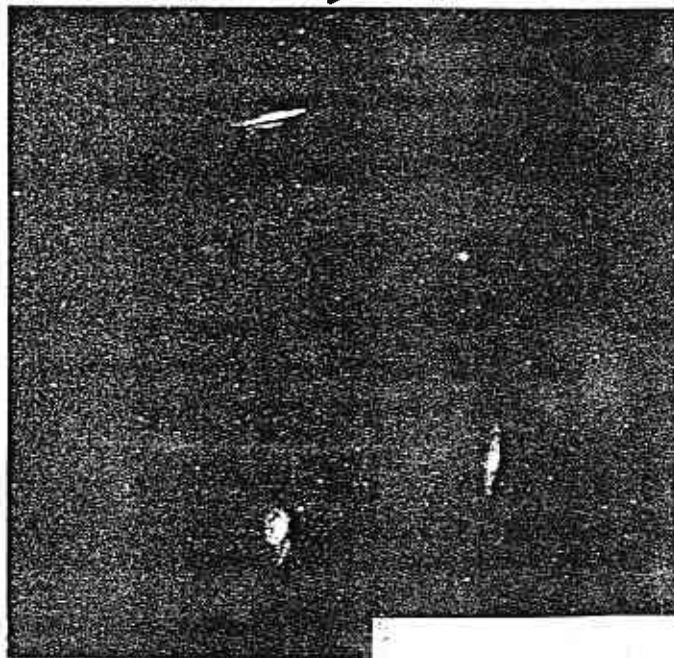


Photo by David Malin/AAT

**M95 & M96 (NGC3351 & NGC3368) and M105 (NGC3379):** Here's a nice trio of galaxies at distances ranging from 22 to 25 million l.y. away. M95 and M96 are a pair of spiral galaxies of mags 10 and 9. Small telescopes should show them as circular nebulosities. (RA 10h 44m, +12°). Their neighbour M105 (RA 10h 48m, +13°) only 1° away, is a smaller mag 9 elliptical galaxy. Can anyone spot these three and give some observations?

One star I didn't mention was **Wolf 359**. Chances are you won't spot it, being mag 13.5, but it's somewhat special. At RA 10h 56.5m, +7° 01', Wolf 359 is a red dwarf, about the size of Jupiter, and very faint. It has the distinction of being, at 7.7 l.y., the third closest star to our Sun, after Alpha Centauri (and family) and Barnard's Star.

So, there you have Leo.

Bob Bee ■

