

PRIME FOCUS

Volume 2 Issue 5

June 1997

PRESIDENT
PHIL AINSWORTH
(02) 9605 6174

VICE PRESIDENT
NOEL SHARPE
(046) 253 051

SECRETARY
DAVID MCBEAN
(046) 559725

EDITOR
BOB BEE
(046) 251623

Contents of this Issue:

	Page
President's Report.....	1
Apollo 8	4
Book Reviews	5
What's To See In June/July?	6
Constellation Star Names.....	7
Mystery Galaxy of the Month	7
From the Editor's Desk	8
Astronomy by Video Camera	10
Getting Started	11
The Lone Stargazer.....	13
Notice Board	13
This Month's Constellation - Scorpius...	14

PRESIDENT'S REPORT

It is great to see you all again. Welcome to any visitors coming to their inaugural meeting. We are starting to grow, with 30-35 regular members attending each month and overall maintaining 50 plus. I wish to thank those who have paid membership. Unfortunately Eric & myself have found fees from some members are still owing. Please see me, Noel or Eric on the night or mail a cheque to our new address (by end of month if possible) as we need to send financial statements for certain institutions. The Society's new postal address is:

Macarthur Astronomical Society Inc.
c/o The Secretary
P.O. Box 17 MINTO 2566

Last month's meeting on the Tuesday was a great success, with 35 members attending and being entertained by our guest lecturer Ron Royal. Those who came saw one of, if not the best speaker we have had so far at MAS.

Thanks to Eric Brown for taking on the Treasurership. His skills in keeping the books are much appreciated by all the committee and members of the society.

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

This month's meeting promises to be something special. Jonathan Nally from 'Sky and Space' is speaking to us on the Mars Pathfinder and Global Surveyor missions with the first spacecraft due for to land on the Martian surface within 2 weeks (July 4th) from tonight. (Mission preview in past issues of Prime Focus).

In **July** we will be treated to International Scientist Seth Shostak who will give us a talk on "The Science of Star Trek" -- (This is not Science Fiction). Don't miss it, he is a brilliant speaker.



July's Guest Speaker - Seth Shostak

In **August** we will hold our first Work Shop. Please let some of the committee know what you would like to see put in it, as we need to start planning. Some of the surveys have come back and we will be implementing most of your great ideas.

September-- Possible guest lecturer -- Scientist with a Ph.D. in Astronomy

October-- Steve Manos, International Space Camp. (Yet to be confirmed)

November-- Holiday snaps from a prominent member of the society on his trip to the states and Kennedy Space Centre.

December-- No meeting-- Christmas Picnic (Date to be announced).

January 1998 --We will hold a January meeting. We didn't last year and the 2 months gap was too long.

EVENTS

JULY 5th-- Berrima--Talking to another society, Independence House. They support bright international students who come over to do study. If you can come with a scope I need all the helpers I can muster. Ring me if available ASAP by July 1st.

Camp Constellation 4 -- Saturday, 12th July (Yes it will be cold) at Carol's. See notice board, me or Noel for a map of how to get to Wilton. If coming to the camp be sure to put in some very warm clothing, food, drink and sausages as we will have BBQ facilities available.

President's Report (Cont'd)

July Saturday 26th Open Night commences 6.pm. Could members please arrive at 5.pm to help set up. Any help or support you can give would be greatly appreciated.

This night is going to be huge. In conjunction with the University and SETI, we are holding an open night for members, guests and the local community. We will have food and drink supplied by caterers, telescopes via 2 or 3 societies, stalls courtesy of Sky & Space, Binocular & Telescope Shop, York Optical, Quasar Publishing and slides, films and guest lecturers, including Dr Seth Shostak. Many visitors will be coming so any help by members will be greatly appreciated **ESPECIALLY TELESCOPES--**

IMPORTANT--- This event will **not** be cancelled by bad weather. Alternative wet weather arrangements are at present being organized.

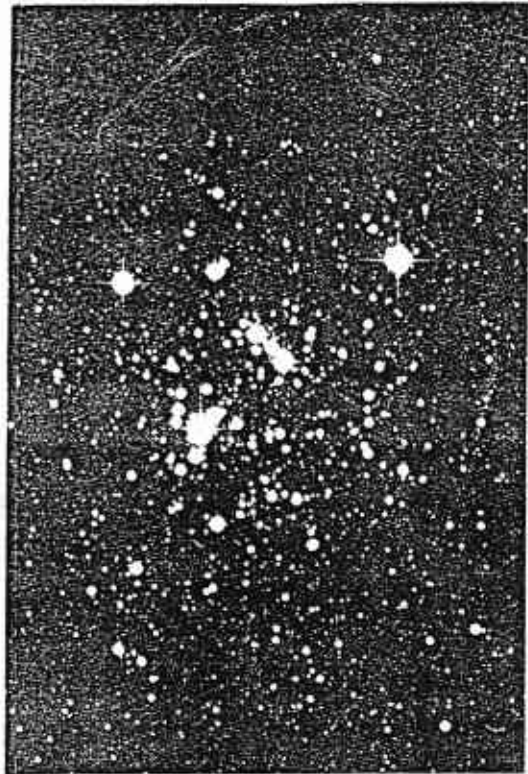
Camp Constellation 3:

The past three camps have been enormous fun, great observing and I personally have many happy memories of these events. Low numbers are still only attending with a core group of 8-10. The camp is only cancelled due to extremely poor weather, as in the past the sky has often looked poor and cloudy, but has turned out fantastically clear. It would be great to some more members there, and then they can participate in seeing some of the great objects to be seen in the dark skies of Wilton.

OVERVIEW OF CC3:

Camp Constellation 3, despite the early inclement weather, was a great success. I personally had a fantastic time whilst seeing Comet Hale-Bopp, Tucanae 47, M6 & M7 clusters plus a host of other regular objects such as Alpha Centauri, Sirius and Omega Centauri. One of the biggest highlights, if not the comet, was seeing the

Space Shuttle Atlantis and the MIR Space Station pass overhead. The weather forecast suggested a gloomy and wet night so we all decided not to sleep over and have an early night (11.00 pm). As all the astronomers who came would unite in saying with me, it was a fabulous night as we all saw something new and previously not seen from any other star nights we have attended.



NGC 4755 - The Jewel Box
(Photo by D Malin - Used by permission)

LATEST NEWS

The Shuttle Columbia blasted off successfully on May 4th and conducted many varied experiments in micro-gravity. They included growing plants, food, and observing how they react to and survive in space. However, tragedy struck after only 2 days with a generator failing (one of four), so for safety reasons they cut the mission short. The Shuttle is having a quick turn around and will fly again in early July to complete its objectives.



President's Report (Cont'd)

Space Shuttle Atlantis has just successfully completed a rendezvous with MIR and picked up an American astronaut after he spent 142 days in the problem plagued space station. With a rapidly decreasing space budget (Russia) MIR with all it's problems continues somehow to survive and function. Many difficulties occurred during his stay, A fire, oxygen and recycling systems stopped working, an EVA was required to assess any damage caused on the outside of the station from a near collision with a cargo vessel. Let's hope The International Space Station is soon to be up and running (possibly late 1999, or early 2001). The first component is being put into orbit this November/December.

Mars Global Surveyor is also on track for an orbit of the Red Planet...

Mars Pathfinder continues to operate successfully. It is only 2 weeks away from landing and exploring with a small rover which has an expected life span off 30 days (hopefully longer). However, the Lander should continue to operate for much longer, taking stunning pictures of the landscape, evaluating and sending the valuable data from the rover, and as a bonus giving us constant weather reports and conditions on Mars.

Mars Global Surveyor is also on track for an orbit of the Red Planet in September. It will start mapping the surface in February 1998.

Phil Ainsworth - President



APOLLO 8

The Apollo 8 mission used the first of the Saturn V launch vehicles and also performed the very first Lunar Orbit which proved that mankind could travel to space and return from a great distance. The three brave men, Frank Borman, James Lovell Jr and William A Anders on December 21, 1968 all confronted the cosmic radiation away from Earth's protective atmosphere and lived in a space craft for over 5 days.

Amazing high resolution pictures showed the barren surface of the Moon and some safe landing spots for the later Apollo 11 mission. The first ever man made observations and good quality photos were taken of the dark side (no, not Star Wars) of the Moon (the side never seen from Earth). This part of the Moon was seen to be even more heavily battered by impact craters.

One of NASA's most cherished scenes for all mankind was photographed and placed forever into books, slides shows and posters. Would anyone like to guess this famous snap?

On Christmas Eve 1968, the astronauts used a video camera to show live to all the Earth the sheer magnificence of the surface of the Moon. That night they sent a message to everyone on Earth and wished us all a Merry Christmas.

The crew, during their 147 hours of flight, created history not only by orbiting the Earth but circling the moon 10 times and approaching the surface to approximately 110 kms. On December 27th they splashed down on Earth within 2.5 kms of their target. A very successful mission.

Phil Ainsworth

BOOK REVIEWS

'Australian Astronomers'

(Ragbir Bhathal)

Ragbir as most of you will know is Director of the SETI Institute in Australia and we are very privileged to actually have him as a member of MAS.

His book as the title suggests is about Australian Astronomers throughout the history of Astronomy in Australia.

He interviews greats such as Bart Bok who came to Australia in 1957 and became Director of Mount Stromlo and had some fabulous work published on the Milky Way to gain world renown in Astronomy.

The book is not a light read, nor a highly scientific one, but middle range and explains what the Astronomers are well known for and some of their greatest discoveries.

A limited knowledge of Astronomy would be an advantage when reading this book. However a keen interest in History and astronomy as I have would see you enjoy the book immensely. This book is available for loan from the MAS library, just ask me for it and it's yours for one whole month.

Phil Ainsworth

AUSTRALIAN ASTRONOMERS

by Dr Ragbir Bhathal

Few Australians have such a long view as our astronomers, and few astronomers have such enormous clear skies

This absorbing new book turns the lens on 18 of Australia's best known astronomers, allowing us to understand some of the scientific challenges which have transformed Australian and international astronomy in the last 50 years



\$24.95 Available from the
National Library of Australia
Tel: 1800 800 100 and
good bookshops.



'Pale Blue Dot'

(Carl Sagan)

No other astronomer has encouraged me more to follow up my interest in astronomy and space travel as did the late great Carl Sagan who unfortunately died on Dec 20th 1996 at the young age of 63.

This book was an experience which must be shared. With Sagan's enthusiasm it made an item I could not put down.

The book title is inspired by the Voyager spacecraft when it took a photograph of the planets after its final farewell to our solar system. Earth is but a pale insignificant blue dot when seen from millions and millions of kilometres away, with no hint of a civilisation or even life existing on this small blue rock.

He briefly describes some historians of Astronomy such as Galileo, explains his own views on how the Universe began and then goes onto the possibility of existence of life elsewhere in the Galaxy, and whether or not Earth is seen from space as having life and intelligence. The Galileo spacecraft took scans and photographs of our planet to see if it could detect any intelligent life (hopefully it didn't scan Canberra too thoroughly).

Sagan then captured my imagination by revisiting Venus, Mars and encounters with Saturn, Uranus and Neptune. Also his dream of travelling to and living on these worlds in the future.

Sagan also recaptures the height of the Space glory days of NASA and goes through the Apollo era.

Carl Sagan was not only a scientist with an uncanny and very brilliant mind, but his visionary charismatic enthusiasm to impart knowledge to the average person will never be forgotten and is very evident in this book. I recommend this to anyone who is a dreamer and hopes to eventually see us head towards the stars.

Phil Ainsworth

What's to See in June/July?

The cold winter months bring not only chills and runny noses but some great viewing nights. This is the time to get out there in the dark and see those clusters and nebulae. Also, there are plenty of planetary and cometary events to observe. Such as:-

* The constellation **Scorpius** is very high and contains many easily viewable objects. See the article in this issue for details.

* On the 15th of June, comets **Hale-Bopp** and **Encke** are both visible in the low western twilight. A rare opportunity to see two comets in one field of view. They are only 3.5° apart.

* At the end of June, comet **Encke** will be at its brightest in the western twilight at about 6th magnitude. Also, in early July, it will be at its closest to Earth in the history of its many passes (since discovery, anyway). Encke will be 0.19 AU (about 29 million km) from Earth. It will be moving quickly through the constellations, so check your copy of *Astronomy* 97 for positions from night to night.

* In July, **Hale-Bopp** will only be visible in the early dawn (Eastward, of course).

* June and July will be good months for viewing **Venus**. After 22nd June, it will be setting progressively from 6.30pm to 7.00pm, and setting even later into July. On the 4th and 5th of July, Venus will be seen against the Beehive Cluster (M44) in Cancer. (See Issue 2 for Cancer details).

* July is also a good opportunity to see **Mercury**. In early to mid-July, it will set progressively from 5.30pm to 6.30pm. On the 12th July, Mercury has its turn to occupy the Beehive Cluster. Binoculars, not telescopes, are recommended.

* A good time to view **Mars**, which sets from 1am to 11pm between mid-June to end of July. Mars's brightness will reduce gradually from 0.4 to 0.8. Don't confuse Mars with the supergiant Spica - they'll be about the same brightness and very close, particularly at the end of July when they'll only be 2.5° apart.

* Towards the end of June, **Jupiter** will be rising about 8pm, and earlier in July. In June and July, Jupiter will be *bright* - mags -2.6 to -2.8. It is approaching opposition. Here's a good opportunity to observe Jupiter's retrograde motion against the backdrop of stars. From 10th June onwards, it will appear to be moving westward past the stars (opposite its normal passage). If you're not familiar with planetary retrograde motion, now's a good time to ask.

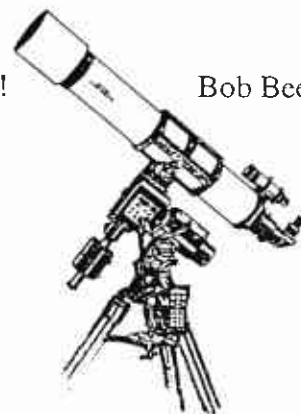
A rare opportunity to see two comets in one field of view.

*Put your woollens and alarm on if you want to view Saturn. Though bright at mag 0.5, it is a morning object, rising from am in mid-June to 11pm in late July.

* If you know where to look and have a large enough scope, try Uranus and Neptune. They are both in opposition in July, at mags 5.7 and 7.8 respectively. Their rising times make them visible the whole night.

Good Hunting!

Bob Bee ■



The Answer to... Constellation Star Names

I find it hard to believe that no-one accepted my challenge to research the names of the stars in the 88 constellations and determine the constellation with the most 'named' stars.

Are you all 'too busy' star gazing to dive into books? Maybe that's a good thing. Whatever!

Well, in order to provide an answer...

(I know most of you are dying to find out) I did the necessary book work and the exercise was fascinating. I had no idea there were so many insignificant (even trivial) constellations in the 88. Nor that some of them were so large and complex. Nonetheless, I counted up the 'named' stars in each and found the 'winner'.

It was...and please feel free to argue with me over this as your source may be better than mine and I love a good argument...

Ursa Major - the Great Bear (14 named stars) with Eridanus running a close second (12 named stars).

For you doubters out there, the stars are:

α - Dubhe (bear);	β - Merak (the flank)
γ - Phecda (thigh);	ϵ - Alioth
δ - Megrez (root of the tail);	ζ - Mizar
80 - Alcor;	π - Muscida
η - Alkaid or Benetnasch (leader of the mourners);	ι - Talitha
λ - Tania Borealis;	μ - Tania Australis
ν - Alula Borealis;	ξ - Alula Australis

Unfortunately, we can't see them from Sydney so you'll have to take my word for it.

Bob Bee

Mystery Galaxy of the Month

OK Peter, committee members are excluded from getting credit for this one.

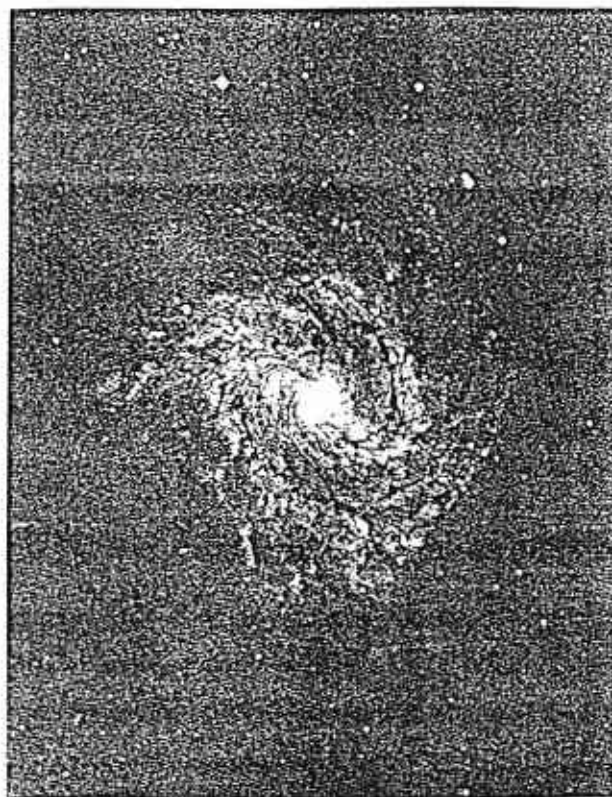
The galaxy in the photo below should be familiar. It's about as 'face-on' as they get.

Hint: It has an M number.

So, credit in the next Journal (August) for the first member to tell me its M number, the constellation in which it is found, and bonus credit for its NGC number.

(Photo by David Malin/AAT

Used by permission)



From The Editor's Desk

Despite the depressing weather on the Friday and then Saturday morning, Camp Constellation 3 actually delivered a good viewing night up to about 9pm.

Understandably, due to the foreboding weather, only a small but hardy group turned up. But we saw the comet. Hail Bopp (...and Hale, of course).

It was Dick Everett who saw Comet H-B first, calling us back to Carol's car park to get a shallower angle over the trees.

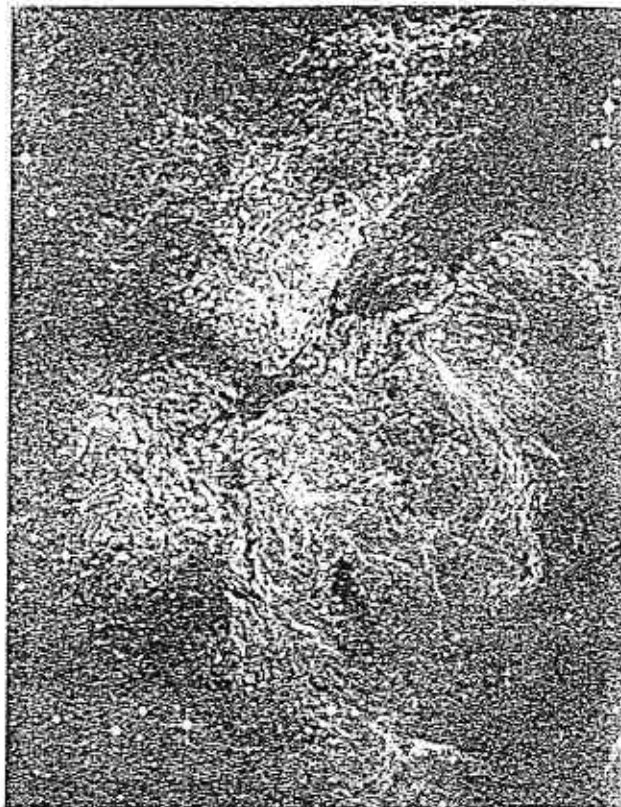
Thar she blew, a naked eye fuzzy ball with a faint 'shuttlecock tail. Telescopes were aimed and focussed as the 7x50 and 12x50 binoculars were passed around. Great stuff, thoroughly enjoyed by all, even those who had seen the comet before.

After about 30 minutes of views at all magnitudes, comet curiosity was sated and we returned to the lawn to continue our star gazing night. Miraculously, we had a perfect clear, dark sky.

Eric showed off his latest share-ware Star Map program on his laptop, while Dick gave many of us the benefit of his broad knowledge of star, constellation and cluster identification.

For myself, the highlight of the evening was confirmation of the identity of Eta Carinae. I've always understood its general location, but when I pointed my binoculars at that location, I was never certain which group of stars in the field of view was the Eta Carinae cluster. None of them ever looked like the beautiful photos in the books (naturally). However, Dick and I stood side by side, each holding binoculars and we talked our way from feature to feature, comparing appearances and directions until I knew I was looking at the same spot as Dick. That, he told me, was Eta Carinae.

But the beauty of that exercise was that the sky marks we used to find Eta C were themselves worthy of further observation. We studied them through our binocs, debating whether they were open or globular clusters. We made no firm conclusions and agreed further research was necessary.



Eta Carinae Nebula NGC 3372

(Photo by D Malin - Used by permission)

I've since identified the clusters in my Collins Pocket Guide to Stars & Planets and will highlight them in an article on the Carina Constellation in the next issue of Prime Focus.

The rest of the night was delightful chaos - at least from my perspective. I can't report what Eric, Noel or Phil were doing with their scopes. I was too busy moving

From the Editor's Desk (Cont'd)

around in the dark to skirt the trees and pick up the dark sky to the south east and south. The LMC and Tarantula Nebula were visible, the Southern Cross, Omega Centaurus. Dick showed us where to see Centaurus A but, even with my 12x50s, I wasn't convinced I saw it.

Then Scorpius rose. What a delight chasing M6, M7 and NGC6231 amongst the trees. What a magnificent constellation!

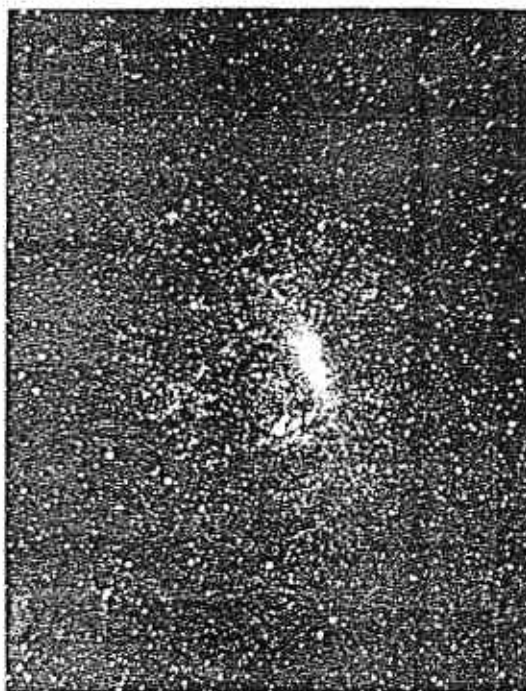
Unfortunately, just as a crowd began to join in the cluster hunt the clouds began to appear. Within minutes, we had lost Scorpius, then the northern sky. Our luck had run out, it seemed.

Yours truly, with a big day ahead on Sunday, reluctantly pulled up stakes. When I reached home in Ruse, the sky was clear again and I went out on the back porch for some more viewing (in a not so dark sky).

All in all, and with Dick's valuable help, I had made another quantum step in my understanding and knowledge of the southern sky. See you there next time.

Good Seeing.

Bob Bee ■



The Large Magellanic Cloud (LMC)
(Photo by D Malin - Used by Permission)

IT'S ALL GREEK TO ME

The brightest stars in each constellation are assigned Greek letters to indicate their relative brightness. Below is the Greek alphabet to assist you to read the star maps.

α	alpha	β	beta	γ	gamma	δ	delta
ε	epsilon	ζ	zeta	η	eta	θ	theta
ι	iota	κ	kappa	λ	lambda	μ	nu
ν	nu	ξ	xi	ο	omicron	π	pi
ρ	rho	σ	sigma	τ	tau	υ	upsilon
φ	phi	χ	chi	ψ	psi	ω	omega

The Lone Stargazer

As the dew gently fell from the dark void above, it would seem that only the foolhardy would be brave enough to venture outside of one's warm bed.

On dark clear nights somewhere in a field distant from our urban sprawl, a small dim red light will announce the presence of "The Lone Stargazer".

His family and friends have some concerns over his state of well being, as for hours on end, even if skies are heavily laden and misty white clouds shroud the trees, he will be there.

He is no fool, for the Lone Stargazer is well prepared with suitable attire, warming beverages and a plan of attack.

The wonderment of the night sky awaits like a giant jewel box in expectation of being opened and explored.

The Dog star, Sirius, shines like a beacon and Rigel's companion is on the edge of one's imagination to see. It's a never ending parade of Orion, Scorpius and Sagittarius and the Southern Cross. Splendid sights indeed that started hours earlier with a strange new visitor called Hale-Bopp.

As with the great warriors of the past who held swords and shields up high, the Lone Stargazer's weapon is his Lightsaver, an instrument gathering 1,000 times the starlight that falls into our own naked eyes.

The Lone Stargazer never tires of the night sky as this is always a passing parade of splendour.

For the better part of the night, Mars the god of War has held court, blazing red in all its anger. As trying to avoid the anger of Mars, the Southern Cross raises its shield

made of darkness we call The Coal Sack.

The Lone Stargazer has satisfied his imagination and momentarily pauses. In quiet reflection he partakes of a warming beverage and rests his eyes.

A gentle fog now enshrouds the observing field with the rising moonlight filtering beams of gentle white light through the trees. At this point, one does feel that the mind and soul can be separated from the vehicle it travels in.

The time has come to retire, sleep and renew one's energies for the next adventure of "The Lone Stargazer". ■

Written by Noel Sharpe

Based on true stories and observations.

NOTICE BOARD!!!



MAS is pleased to announce

- **Camp Constellation 4** - the biggest and the best. Bring tents, BBQs, telescopes or just yourself.

When? **Saturday, 12th July.**

Warning! Bring lots of warm clothing.

2 eyepieces for sale. 6.3mm and 17mm Celestron Possol. \$100 for both. See Lou.

Photofest - Bring your photos of Hale-Bopp to the next meeting. Let's share and compare.

Getting Started

The greatest barrier to observing the night sky is, to most beginners, identifying just what it is they are looking at.

The experienced observer does this by using landmarks (skymarks?). These are easily recognised star formations, usually the brighter ones, together with an understanding of how they are situated relative to one another.

The equipment needed for gaining this knowledge besides the Mark I eyeball is a 'starwheel' or Planisphere. This device allows you to display the star formations for any night of the year, and gives quite a good idea of how they rise and set as Earth rotates.

Following this plan will... produce a delighted telescope owner

I found it a good help initially to commence observations as darkness fell. This allows you to identify the stars by their magnitudes. It still fascinates me to watch the darkening sky as first Sirius, then Canopus and the Pointers wink on just like somebody turned a switch. Parts of Orion become visible, then most of the Southern Cross can be identified and so it goes.

Once the major stars have been imprinted on your mind, you can start to assemble the constellations to which they belong, and for this some sort of star map or chart is needed. I found a little pocket book called 'The Night Sky' from Wm Collins Sons & Co. It is about the size of a packet of cigarettes and written by Ian Ridpath and Wil Tirion. It has all 88 constellations mapped separately with a text describing their salient points. Being a British publication means that unless you are looking southward, the maps are inverted but I didn't find that much of a problem.

The beauty of individual maps is for most constellations the mapping distortion is minimal as compared to conventional star maps. Its small size makes it convenient to carry and easy to orient to the angle the constellations present to you as they wheel across the sky.

Regular observation will help you to follow the way the star field moves. It can be quite confusing at first to see how it has all changed even after only a few weeks! If you are used to early evening viewing, you'll be astounded at what has happened to your familiar sky the first time you come upon it after midnight.

Constellations that appear overhead travel more or less in a straight line east to west. But those substantially to our north or south travel in curved paths and rotate at the same time. Many southern constellations (eg Southern Cross) never set but just rotate around a point in the heavens called The Celestial South Pole.

Once you can pick out the major star formations, you will be quickly able to go to the general location of whatever you are searching for and will benefit from the use of a pair of binoculars. Much more rewarding at this stage than a telescope, these will allow you to find the dimmer constellations and many beautiful star clusters, globulars, binary stars and nebulae. Good skies and good binoculars will even have you finding galaxies.

Following this plan will eliminate most of the frustration experienced by first time telescope buyers and will produce a delighted telescope owner able to get the most from such an instrument.

Dick Everett



Astronomy by Video Camera

Before Christmas I purchased a video camera - a Panasonic RX7, with some quite unusual features. It had a wide optical zoom of X14, but in addition has a further digital zoom up to X10, giving a maximum zoom of X140. The digital technology also gives it other useful features, such as image stabilisation - so the electronics tries to keep the image from jumping about from hand shake at higher magnification.

I had already found this useful in taping my son Go Karting, and found that when set on the digital zoom, the transition from optical to digital zoom was seamless and smooth. I wondered about this video camera's possibilities for use in observing astronomical objects, and began to play around with it to explore its potential.

In the late afternoon, with a near full moon in the sky, I zoomed in on the moon. From a small spot in the sky, barely visible in the viewfinder, an optical space journey to the moon took only seconds, as this pin point enlarged to more than fill the screen at the maximum X140 magnification. The first finding was that electronics cannot do miracles, and the image danced all over the place, with the electronics momentarily holding it still, then losing. So:

1) If you want to use high magnification, over say X50, you must use a tripod or other steadying device.

The digital zoom works by viewing a smaller portion of the full image, so as the digital zoom increases, so does the size of the pixels, and the spacing between, so:

2) Image quality falls away at high magnification.

After dark, I got out my telescope and made a modification to the counterweight.

I drilled and taped a thread into it so a small 1/4" Whitworth stud could be fitted, and I mounted the video camera onto this counterweight. I aligned the video camera with the telescope, and started to zoom in on the moon. Something was now different! Instead of seeing the larger craters on the moon as I had in the afternoon, all I could see now was a bright ball of light. Another limitation was now obvious - there are many ways to enhance the light gathering of this video: high gain setting; low light setting; backlight setting; but:

3) No adjustments to make a bright object dimmer against a dark sky.

It is obvious that Panasonic did not have astronomy in mind when they designed this camera!

I fiddled with just about every setting, but to no avail. So I then resorted to placing my hand over the lens and trying to cut back the amount of light that the camera received. But Panasonic designed the camera well, and as I cut back the light, the electronics took over and boosted the gain automatically to keep the image as a bright ball of light.

... an optical space journey to the moon took only seconds...

I then reasoned that I might fool the electronics by making some part of the view even brighter than the moon, so it would shut down the gain, and make the moon darker. I went into the garage and got out my engine cylinder viewing light - a small light globe on a flexible rod that can be inserted into the engine so you can see inside. I took this out and waved it around, and sure enough, in exactly one place, this light fooled the system, and craters



Astronomy by Video Camera (Cont'd)

appeared on the moon. However, this was not a real solution, as you had to spend all your attention in placing the light just right, and as soon as it moved a little you could not see anything - like looking at a partial eclipse of the moon - all or nothing!

Another thing that is obvious, and affects telescopes just as much, is that the sky moves. So, the higher the magnification, the more the apparent movement. With the video camera set up on the counterweight of the telescope though, normal correction for the Earth's rotation kept both the video and the telescope pointing in the right place.

It records your comments and, when you want, can erase them and start all over again.

Well, for the time being, the moon is a dead loss, so I peer out further into the heavens, to Jupiter. Yes, I can see it - but not its moons, and there is no detail on the surface of Jupiter at all. I increase the gain by going to a low light setting, and at maximum magnification I can see some nearby stars or moons. The next limitation is noticed:

4) The apparent size of the object increases at high gain.

I refocus, but this didn't change it. I guess that like in photography, where a pin point of star light causes a small circle of exposed silver salts to give an image larger than it should, the camera is doing the same. The outcome is that there is no real detail - the resolution is not there.

I then shifted my attention to Mars and found the same effect. However, there was a difference. At low, normal gain Mars shows as a white circle of light. However,

at high gain, it shows as a slightly larger circle of light, with no detail, but now coloured red! This effect is unique to Mars so far, so on the positive side, the video can see the RED planet - even if only with misty eyes.

But the video has some especially good features that may not be apparent to all. The best is that it records sound. So instead of having to write notes in the dark, at the same time keeping the telescope aligned and observing as well, you can concentrate on looking and keeping alignment, and just talk. It records your comments and, when you want, can erase them and start all over again. Also, with a TV set up, many people can look at the image, not just one lonely observer!

I am continuing with this playing around and, for instance, have found that placing a disc with a 1/16" hole in it in front of the lens, lets me see detail on the moon - but by forcing the camera to maximum electronic gain, so the image is much more grainy than before.

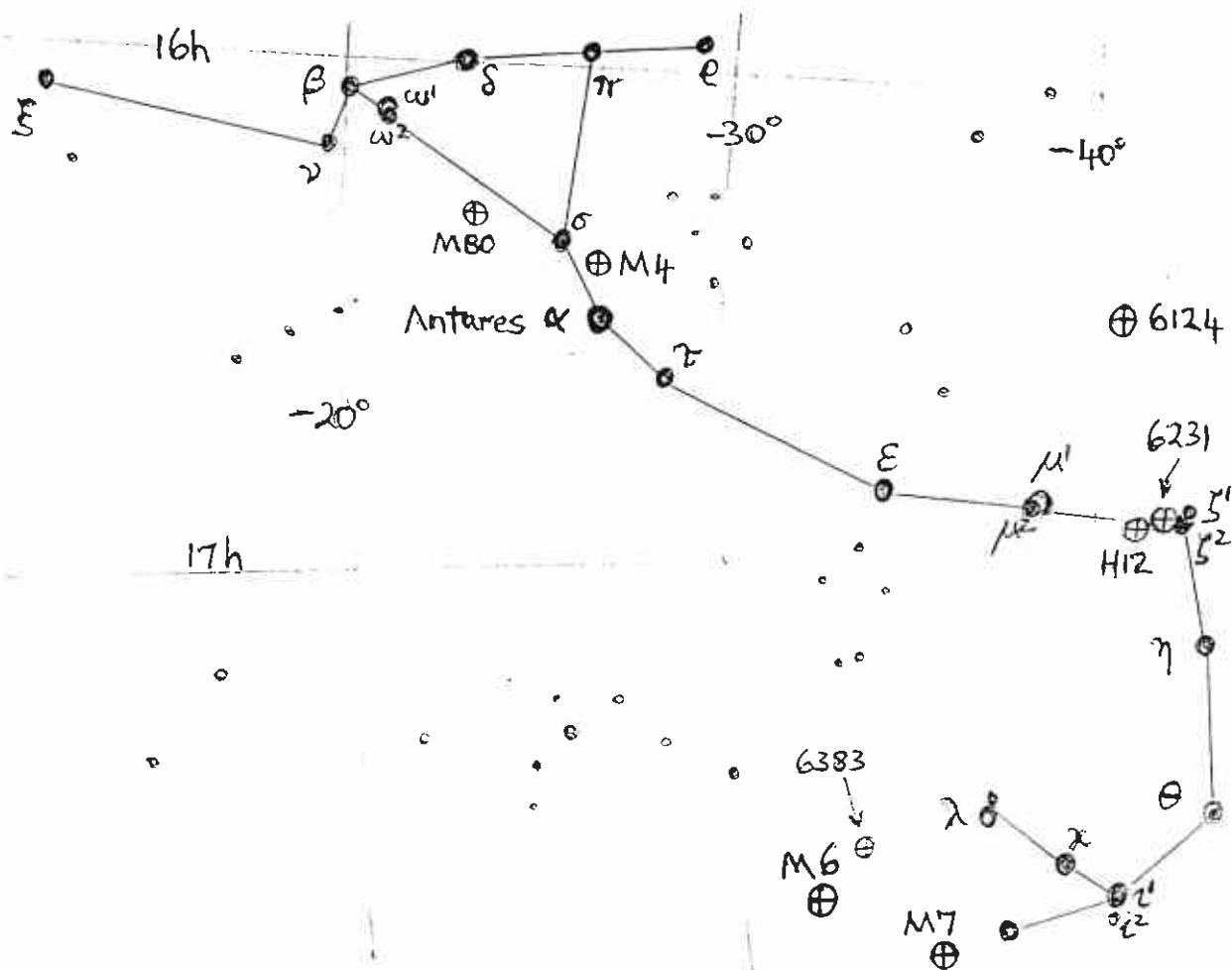
John Casey



This is a very interesting article by John, describing his practical efforts to utilise his video camera for astronomy observing. If any other Society member has any helpful comments or practical tips that may assist John in his endeavours - or indeed those of any other members who may wish to try the same video camera techniques - please submit them to the Editor for inclusion in a future issue, or maybe discuss them directly with John.

■ Editor

Scorpius - The Scorpion



This 'Winter' constellation is one of my favourites, especially for viewing with binoculars. There's so much to see. And, like Leo, it resembles what it represents. Watch for the stinging tail. It killed Orion, who still skittles over the western horizon as soon as Scorpius rises in the East.

α (Alpha) Scorpii - Antares (meaning 'like Mars' because of its bright orange appearance) is a red supergiant only 170 l.y. away. Though over 400 times the diameter of our Sun, (i.e. at least 560 million km diameter - 100 million km more than the diameter of Mars's orbit), it has only about 20 times the mass of the Sun. Thus, its mean density is about 2 ten-millionths that of the Sun, or about 1/10,000th that of ordinary air. A pretty 'thin' star.

Antares is visually interesting because it "*illuminates a large, faint, irregular nebula that it has created by loss of particles from its cool distended surface.*" (D. Malin - 'A View of the Universe'). In fact, few great reds are "*such prolific polluters of the space between the stars as Antares.*" (Ibid)

Antares's magnitude fluctuates from 0.9 to 1.8 about every 5 years, being a semi-regular variable. (16h 29m, -26°).

β (Beta) Scorpii, which enjoys two names - Acrab ('scorpion') or Graffias ('claws'), is in fact a visual double. Small telescopes can divide this into two blue-white stars which are actually 200 l.y. apart. The mag 2.6 star is 520 l.y. away while the mag 4.9 star is 720 l.y. (16h 05m, -20°).

Scorpius - The Scorpion (Cont'd)

...and a piece of interesting trivia...

At 16h 19.9m, -15°38', just north east of β Scorpii lies Scorpius X-1 (sounds like an experimental rocket), the brightest X-ray object in the sky. Hard to see at 13th mag is its source, a spectroscopic binary about 2300 l.y. away.

δ (Delta) Scorpii, named Dschubba ('forehead') is a blue-white star, mag 2.3, about 620 l.y. away. (16h, -23°).

ϵ (Epsilon) Scorpii, about 65 l.y. away is an orange giant, mag 2.3 (16h 50m, -34°).

ζ (Zeta) Scorpii is a double visible to the naked eye, though the two components, ζ^1 and ζ^2 are not related (step-stars?). ζ^1 is a blue-white supergiant (mag 4.7) while ζ^2 is an orange giant 190 l.y. away (mag 3.6). ζ is at 16h 54m, -42°.

Immediately adjacent to ζ Scorpii is an attractive "Pleiades shaped" naked eye cluster of about 100+ stars. Great with the binoculars (I picked it up nicely from my back porch in Ruse with my 12x50s) or small telescope. This is NGC6231 which is about 6000 l.y. away (16h 54m, -42°). ζ^1 is thought to be an outlying member of this group. Lying about 1° to the north of NGC6231 is a larger but more scattered cluster of fainter stars called H12. This is also rewarding viewing in a small scope or binoculars.

θ (Theta) Scorpii, 190 l.y. away, is a mag 1.9 yellow-white giant. (17h 37m, -43°).

λ (Lambda) Scorpii, called Shaula ('The Sting'), about 275 l.y. away is a mag 1.6 blue-white star.

μ (mu) Scorpii is very interesting. It's effectively a 'triple', 680 l.y. away. It appears as a naked eye double but its two components are actually a mag 3.6 blue-white star and an eclipsing binary that fluctuates between 2.8 and 3.1 mag every 34.5 minutes. (16h 52m, -38°).

ν (nu) Scorpii is a challenge for binoculars, then larger scopes. At first, it appears in binoculars as a wide double of blue-white stars, mag 4.0 and 6.3. Scopes 75mm+ on high magnification will split the 6.3 mag star into a close double. If you have a 150mm+ scope, you should be able to split the brighter 4.0 mag star also into a double. There it is - a quadruple.

I picked it up nicely from my back porch in Ruse with my 12x50s

...but wait, there's more...

ξ (xi) Scorpii is a somewhat famous multiple star, about 90 l.y. away. At first sight it's another double double like ν Sco, with a mag 4.2 white star and its 7.3 mag orange companion circled by another wide fainter double, called Struve 1999. However, the 4.2 mag white is really a close double (mags 4.8 and 5.1) with a 46 year period. This should be a challenge at winter star nights. You'll need a 250mm scope to split them at present, but a 100mm should do it about 2015 AD. (16h 4m, -11°).

ω (omega) Scorpii - just to the south of β Scorpii is a naked eye double (though the stars are not related). The blue-white mag 4.0 star is 720 l.y. away and the companion orange mag 4.3 star is 330 l.y. away. (16h 7m, -21°).



Scorpius - The Scorpion (Cont'd)

The thing I like about Scorpius is how bright most of its main stars are. From alpha to omega, they range with mags of 0.9, 1.6, 1.9, 2.3, 2.6, 2.8, 3.6, 4.0, 4.2. No wonder it stands out in the sky.

And now for the clusters - get your binoculars ready.

M4 (NGC6121) - a globular cluster at 16h 24m, -27°. I spotted its central condensed area through my 12x50s but only just. Fainter than its 6th mag suggests, it is large (being close at 6800 l.y.) but very diffuse over an area as big as the moon. With scopes 100mm+ , you should be able to resolve the stars and even possibly a central bar of stars.

M6 (NGC6405). Hanging off the tail of Scorpius are two excellent open clusters, ideal for binoculars and small scopes. The further away (from the tail) is the smaller and fainter 4th mag M6 at 17h 40m, - 32°. It contains around 80 stars in a shape that earned the name 'Butterfly Cluster'.

..Just begin at the head, scan along its body and then its tail and beyond.

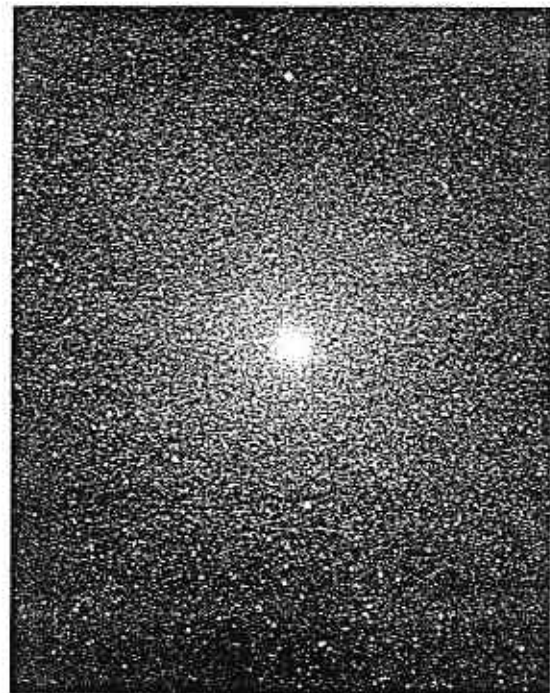
M7 (NGC6475) is visible to the naked eye as a fuzzy cloud about 2° north of the tail star G Scorpius. With M7 in mid binocular field, M6 is also visible at the periphery. In binoculars M7 is a gold mine, an open cluster of about 80 stars, 800 l.y. away covering an area about twice that of the moon. Individual stars are easily resolved in binoculars, with the brightest stars being about mag 6. The overall shape of the full cluster has been colourfully described as a Christmas tree. What do you think? (17h 54m, -35°).

M80 (NGC6093). Located between β and σ Scorpii is this small globular cluster lying 27,000 l.y. away. It's understandable why Messier at first thought this was a comet, earning the M number. At mag 7, on a dark clear night M80 is visible in binoculars and small scopes, looking like the fuzzy head of a comet. I confess I couldn't pick it from Ruse - maybe at the next Star Camp.

So, as this article suggests, Scorpius is an excellent subject for viewing and study. Just begin at the head, scan along its body and then its tail and beyond. With the double and multiple stars, open and globular clusters, even in an 'ordinary' sky, but better still in a dark sky, you'll be well rewarded.

Bob Bee





47 Tucanae - A Globular Cluster
(Photo by D Malin - Used by permission)