MACARTHUR ASTRONOMICAL SOCIETY Inc.

Journal

PRIME FOCUS

Volume 4 Issue 5 June 1999

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PRESIDENT'S REPORT

Welcome to yet another bumper issue of Prime Focus. We have been enjoying great star nights at Cobbitty and will announce our new dark site very soon at Bungonia. It is hoped every 2-3 months we will have some serious astronomy done on these field nights. A map and details should be available by next months meeting.

Did any of you see '60 Minutes' on Sunday May 30th. It was all about SETI and very informative plus great PR for astronomy

LATEST NEWS

CASSINI

The Cassini spacecraft is going remarkably well, and on June 24th this year flies within 600 kms of Venus and receives a huge gravity assist onward to Jupiter. There it will receive another boost onward to Saturn. During its mission it so far has been analysing the inner dust layer of our solar system and will continue this for 10 years.

MARS

Mars Global Surveyor continues to operate and send data back to Earth with some amazing findings. Evidence of Mars having plate tectonics in the past make scientists hopeful that Mars was even more Earth like than originally thought. The areas of magnetic strips are located on the southern hemisphere where most of the cratering has taken place.

MIR FORMALITY

The Russian spacecraft continues to defy logic and is going to remain in orbit longer than expected. It is rumoured that a wealthy businessman has given a reported 1 or 10 billion dollars to keep the aging spacecraft in orbit and to become the first public cosmonaut. Russia is believed to mildly interested.

SKY VIEWING

Mars can still be seen high up in the sky near Spica, and the larger the telescope the clearer the view. However, even in my small 114mm Tasco on a good night with 12 x magnification I have picked up the polar caps and slight smudging on the surface which I believe to be Syrtis Major.

Also I have been getting home from work and getting out the scope and not only viewing Mars but also around 9pm the constellation of Scorpius, with its tail high up as if going to strike. The main pointer star is Antares which make it easy to locate. Also Sagittarius is a great view these nights, I have seen some star clusters which I haven't yet identified but look beautiful through the scope.

Finally my viewing would not be complete without some Lunar observing, on the last quarter 9th and first quarter giving us my best views of the terminator. I don't know if anyone noticed but last month also gave us 2 full Moons on the 1st and also 30th.

MERCURY-ATLAS 8 Sigma-7

Continuing on with the Mercury missions we have a launch of Mercury-Atlas 8 on October 3rd, 1962. Astronaut Shirra whilst in orbit ate beef, vegies and peaches from a toothpaste tube. He took some spectacular photographs, exercised on an elastic-cord devise and broadcast the first ever live telecast to viewers on Earth.

His main mission goal was to manoeuvre his capsule with as little fuel as possible. By short sharp bursts and cutting off the engines he proved that it could work. This meant that the spacecraft could remain in orbit longer than on previous missions.

After 6 orbits and a flight of over 9 hours he splashed down successfully within 7.2kms from the target.

MERCURY-ATLAS 9 Faith 7

Gordon Cooper launched May 15th 1963 and was in orbit for a whopping 34 hours 19 minutes. The main objective was for him to manage his oxygen, electricity, food supplies and report on his physical condition and to top it off the first American astronaut to sleep in orbit.(He also fell asleep on the launch pad).

After 20 orbits a malfunctioning panel light put ground controllers into a mild panic and worried the short circuit would cut out the automatic controls. He was told to bypass the automatic landing sequence and land manually. Eventually after 22 orbits he successfully piloted the craft to splash down within 4.8 kms from the pick up spot.

After Mercury the next phase was the Gemini spacecraft. series which is the subject of our next group of spacecraft just before the Apollo missions which have already been written about in previous Prime Focus editions. After Gemini I will write about the infamous shuttle and then manned spacecraft of the near and distant future.

Phil Ainsworth ■

HINTS FOR TELESCOPE USERS

It has been most pleasing that our Society has had a recent influx of new members. Most of these new members have telescopes or are considering the purchase of one. The Car Park observing and Cobbitty Star Nights have indicated that a real need exists for hands-on assistance and guidance.

I have listed some of the most common problems that present themselves on almost every occasion. It's interesting that many new owners share the same problems, so don't worry – you're not alone.

Yokes & Tripods:

It sounds so simple, but time and time again I come across nuts and bolts that are not tightened on the tripod, especially around the head. When not tight, an object that you have spent some time in locating will slide out of view. It's common that you will hold the telescope tube with your hands keeping the object steady in the finder scope. When you let go and observe from the eyepiece, your object is gone.

The first rule: tighten everything firmly. Use a spanner but don't overdo it. Don't strip the threads and make sure the tripod is level and on solid ground.

A lot of scopes have a yoke assembly. The yoke is the 'U' shaped device that your telescope sits in. For those with equatorial telescopes, ie counterweights and cables, don't feel forgotten. Previous Journals deal with these instruments and are available on request.

The point of contact between the yoke and tripod must be firmly tightened and especially the two knobs that screw into the telescope tube must be firmly applied to the point of friction. i.e. make the scope move 'stiffly'. Don't force the issue but resistance on movement will mean when you observe an object the tube will stay in place and not slide in alt-azimuth. That's sideways and up-and-down.

The Finder Scope:

'Oh dear' the poor Finder Scope. Your telescope's best friend and your only way to find your way around. But this poor little instrument is most neglected. Many finders are poor quality with plastic lenses and only 3 adjustment screws, so we have to do our best.

Some finders can be focussed and the locking ring at the front will allow this to happen. The stars can disappear when the lenses are dewed, so improvise a dew shield out of cardboard and staples and keep a lens cloth handy and wipe often.

Centring the finder scope is essential. Locate a day time object at some distance, the top of a pole, street light or similar. I used a cross on a church 2 km away. Use the telescope to put the object right in the middle of the field. Use any eyepiece as we are only after 'reasonable' at this stage. With the telescope steady, adjust the screws on the finder and put the object in the centre of the cross hairs. Once done, when you look through the finder, the object will be in the telescope at low power.

The Second Rule: Ladies and gentlemen – please attend to your adjustments.

It's Just Overpowered:

Some members are of the opinion that advertising and marketing are based in fact. So the illustrations adorning the box that a telescope comes in is what you will see with the scope inside. Amazing scenes of comets, rings and galaxies. You will be disappointed. You will see little colour, objects will be small and dim. Dependent on aperture (the size of the lens or mirror), objects will shake at high power if you can find them at all.

But all's not lost. In combination with what has previously been written here, use the following instructions carefully:

Use the standard 25mm eyepiece supplied, 20mm will also suffice. At this stage don't use the Barlow lens or the 4 – 6mm eyepiece. Just use the highest number you have. ie 20 or 25mm.

This will give a wider field in the telescope, brighter image and will more importantly give confidence. The 20mm will give 30x magnification in 600mm focal length scopes. ie good low power and it will be useful. Some telescopes can be easily adapted to use a larger barrelled eyepiece, ie 0.96" to a 1.25". This upgrade will improve your scope fantastically, just ask Linda or Daniel (two of the converted).

The Third Rule: A good low power is better than a bad high power.

Conclusion:

I have not given too much technical information here, but you will need to have some knowledge regarding focal lengths, polar alignments, magnifications etc. Please do not be backward in coming forward at the car park observing. Our members are here to assist.

Noel Sharpe ■

Official Dates for Cobbitty Field Nights

10/7/99	***14/8/99***
11/9/99	***9/10/99***
6/11/99	***11/12/99***

THE SKY HUNTER

A challenge was issued to seek and capture a most formidable beast that has to date remained elusive. The prey to be hunted is the S.C.P. (South Celestial Pole). The sighting of a faint pattern of stars near the beast's lair would indicate its near presence.

An expedition made its way to the Cobbitty observing field and once there duly pitched its tents, laid out tables and chairs and astronomical equipment of various kinds.

The eminent Dr Harrison Everett led the hunt with zealous approach ably assisted by the father & son teaming of D&P Macey-Smyth. A surprise late entrant in the guise of Sir Reginald Cook was made welcome. The Sky Hunter knew that men of such calibre would be successful where he himself had failed.

The Sky Hunter admitted that sighting the beast in his polar scope had proven difficult because no-one actually knows what it looks like and attempts to track it down by the nearby faint stars has proven unsuccessful.

Dr Everett seized upon this challenge and produced maps and documents spread across a large research table illuminated by a red filtered lampshade connected to the battery of his all-terrain vehicle. Simply ingenious, isn't he?

The ensemble busied itself using various coordinates and employed the tried and true star hopping method. Young Sky Hunter was led astray and lost several magnitudes due to imbibing in too much of Dr Everett's magic elixir, the one that allegedly soothes and warms whilst providing a stimulus of conversation.

The Sky Hunter was most impressed that that this collection of world renown hunters and explorers were making progress and a rare sighting was made – the faint pattern of stars leading the way to the South Pole. The sighting was confirmed by the Macey-Smyths and Sir Reginald Cook. Dr Everett had done it again.

Being gracious, he imparted his skills on young Sky Hunter as follows: Sight the constellation of Apus; move to the right to a nearby collection of stars; drop downward and locate the 'Y'; slightly right is Sigma Octanis and the asterism will be apparent.

But be aware – the beast cannot be seen, but the asterism indicates its lurking presence. Use your Polar Scope, Dr Everett said, use it well and be exact and that will be as close as anyone gets to the beast.

End of Part One.

BOOK REVIEW

"Longitude" by Dava Sobel.

"The true story of a lone genius who solved the greatest scientific problem of his time."

I would never have believed that a non-fiction book about the search for a reliable method of measuring a ship's longitude could be so gripping. I borrowed it from a friend and finished reading it in two days.

Something we now take for granted with our technology was an almost impossible dream back in the 1600s and 1700s. So much so that the English Parliament offered a king's ransom to the first person to invent and prove a practical device. It had to operate at unheard of accuracy from a rolling deck, subject to humidity and temperature changes and salt spray.

Here is a book about tragedy caused by not knowing exactly where you were longitude-wise. One navigation disaster cost England 2000 men in one night.

The story pits clockmakers against astronomers. It is full of intrigue and skull duggery, triumph and tragedy.

And the winner is... why don't you read it and find out?

Bob Bee ■

WHAT'S TO SEE THIS MONTH?

21st June – 19th July

A bit of a grab-bag this month with close encounters of the moon, planets, stars and clusters. And a comet!

Mercury is back in the evening sky and reaches its maximum elongation (26°) east of the Sun on 29th June. It will be travelling through Cancer and on 30th June will be sitting within 4° of M44, the Beehive Cluster.

In July, Mercury remains in Cancer during the evening twilight. On 14th July, we will see a lovely manage-a-trois with Mercury, the 1 day old crescent moon and M44. In particular, the moon's shadow and a tip of the crescent will be snuggling close to M44. Sure to be a pretty sight.

Photo Opportunity!

Venus: I hope you didn't miss Venus's brush with M44 on June 13th. Venus has passed its greatest elongation from the Sun (11th June) but on 15th July it will be at its maximum evening brightness of –4.5 mag. It will have a disc of 38" diameter and be a third crescent.

Venus will have a 2° brush with Regulus (mag 1) in Leo between 9th and 14th July. Its closest will be on 12th July when they'll be 1.2° apart.

On 16th July, we have another nice trio with Venus, Regulus and the crescent moon.

Photo Opportunity!

Mars: All of June (I'm sure you noticed it) Mars has been hanging close to Spica (in Virgo). It is now drifting back from Spica towards Scorpius.

Mars is in perfect location for evening viewing all this month and July, but getting smaller and fainter. By 15th July, it will only be 10.3" dia. And mag. –0.2.

Jupiter: A morning object but some rewarding views if you can stand the cold. On 22nd June it rises about 2.15am. On 8th July (about 5am), -2.4 mag . Jupiter sits about 3.8° from the crescent moon. This should make for a pretty sight.

Photo Opportunity!

Saturn: Also a morning object, Saturn is not to be outdone by its red-spotted cousin. On 9th July at about 5am (the morning after Jupiter's brush with the moon), 0.3 mag. Saturn is a smidgen closer to the moon at 3.5°. Both Saturn and Jupiter share the morning sky only 15° apart.

Photo Opportunity!

Uranus and Neptune are up in the evening all this month.

On 22nd June, Uranus (mag. 5.7) rises at about 8.20pm and is located at RA 21hr16m24s, Dec –16°34'47" , while on 17th July it will be located at RA21hr13m22s, –16° 48' 58".

Neptune (mag 7.9) which rises an hour earlier than Uranus, on 22nd June will be located at RA20h24m23s, -19°0'51" while on 17th July will be located at RA20hr21m51s, -19°9'34".

Comet Lee was discovered at Ilford by Sutherland AS member Steven Lee. With some persistence you may be able to view it. After July it becomes mostly a northern hemisphere object, so now's your chance.

The following is an extract from the Internet, via //www.skyhound.com/sh/1999H1.html

"Comet Lee will pass closest to the Sun in mid July, reaching a perihelion distance of 0.71 AU. It will pass closest to the Earth in early May at a distance of about 0.72 AU. It will be brightest in early July, reaching perhaps mag 6.7. Note that the mag. estimates used hear are only that; Lee could be considerably brighter or fainter. If it were to have an outburst, it could conceivably reach naked eye visibility. All things considered, June may be the best month to observe.

June 1999: Lee will brighten slowly in June, reaching mag. 7 by month's end. It will move to north-west through Cancer, setting later each

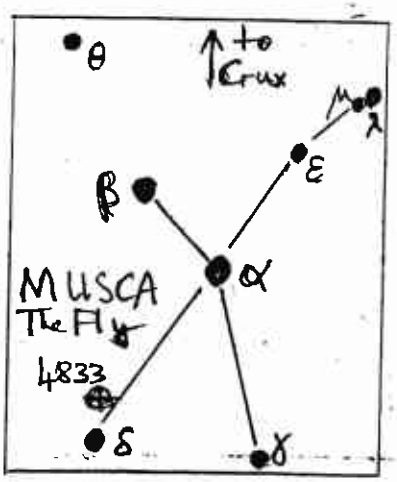
evening. By mid-month it will be low on the horizon, visible during evening twilight. It will be somewhat higher in the sky as seen from the southern hemisphere.

July 1999: Early July will find Lee at its brightest, around mag. 6.7, making it a fine binocular object. It will, however, be quite low in the evening sky, equally visible from both hemispheres. Your best bet to observe Lee this month will be in evening twilight. By the 10th Lee will be all but lost in the glare of the setting Sun. At this time northern hemisphere observers will be favoured."

Constellations:

This is a great time of the year for studying **the Southern Cross** and **Centaurus.** They are very high in the sky and extremely clear. (Least thickness of atmosphere to see through).

I discovered a nice globular cluster in **Musca** the other night. Musca is the trapezium shaped group of 4 stars (I know there are more than 4 in Musca, but the 4 stand out) directly below the Southern Cross (Crux).



Just above δ Musca is a nice globular NGC4833. I was able to pick it out reasonably clearly with MacDob on low power (25mm, 50x) on Tuesday 1st June, with a full Moon over the eastern horizon. I'm looking forward to a moonless night to have another look. NGC4833 should be visible in binoculars. It has a fairly large area and is 18,000 l.y. away. (cf. ω Centaurii's 17,000 l.y.)

While we're on Musca (a much ignored constellation – a fly-weight perhaps): β is a binary with components 3.7 and 4.0. It requires high magnification to split but not a large aperture; θ (theta) is a very interesting double, splittable by small scopes. The mag. 5.7 star is a blue supergiant. Its 7.3 mag. companion is a rare type of very hot star, called a Wolf-Rayet. In fact, the star is the 2nd brightest Wolf-Rayet star in the sky, the brightest being γ Velorum.

It's fascinating that 'special' stars like this can be hidden in apparently inconsequential constellations.

Scorpius and **Sagittarius** are rising higher this month. These two constellations are worthy of a good look, both with binoculars and telescopes. There are clusters and nebulae galore. Take your pick.

Scorpius, of course, is the home of the red supergiant Antares (who is approaching a close encounter with Mars in September). Then there are the binary and multiple stars: β (mags 2.6 and 4.9); ζ (Zeta) (3.6, 4.7); μ (mu) (2.8, 3.6); ν (nu) (quadruple); ξ (xi) (multiple.)

Then there are the clusters M4 (Glob, near Antares), M6 (Butterfly cluster near the tail), M7 (Xmas tree cluster, also near tail), M80 (7th mag glob near head), NGC6231 a lovely rich cluster near the top of the curved tail).

Sagittarius is a cluster/nebula hunter's paradise. Try and find M8 (Lagoon nebula), M17 (Omega or Horsehead nebula), M20 (Triffid nebula), M22 (5th mag glob), M23 (open cluster), M24 (rich star field), M25 (open cluster), M55 (7th mag glob). Not to mention M18 (open cluster), M28 (glob), M54 (glob), M69 (glob), M70 (glob) and M75 (glob).

There you are. Scorpius and Sagittarius have 18 of your Messier scalps in two barrels.

Bob Bee ■

COMING SPEAKERS:

July – Peter Druery

August – John Casey

September – Andrew James

THE SUN - PT 1

J Casey 25/3/1999

The Sun is our nearest star, and has been observed by man and his ancestors for about one million years. But what we know about it in detail is surprisingly new. Even one hundred years ago we did not know how the Sun maintained its heat, and it was only fifty years ago that details of its nuclear processes were worked out.

In the earliest times, the Sun was worshipped as a God that brought life to Earth and made things grow. Then it was thought of as a ball of fire suspended in the sky, travelling across it every day, and returning to its starting position ready for the next dawn, through underground passages and caverns during the night.

The first known attempt to apply scientific reasoning and non deity significance to the Sun was by the Greek philosopher Anaxagoras, at Athens, in the fifth century BC. He reasoned that the Sun was a physical phenomenon that was subject to the same physical laws as the rest of the universe, after a meteorite fell near the town Aegospotami. The meteorite was hot and contained a lot of iron, so he reasoned that the Sun must be a ball of white hot iron moving high over the land. He had also heard that travellers from the city of Syene, in the upper Nile River [near where the Aswan Dam is now built], had said that on the day of summer solstice [the "longest day"], the Sun was directly overhead at noon, and did not cast a shadow. He also knew that in the Nile Delta, about 500 miles north of Syene, at noon on the day of summer solstice, the Sun made an angle to the vertical of 7 degrees.

...he estimated the Sun's diameter as 35 miles...

Using geometry, and the obvious fact that the Earth was flat, he calculated how far away the Sun was from Syene, and arrived at the figure equivalent to our 4000 miles away. He also knew the apparent size of the Sun, as its angular diameter was about half a degree. With a distance away of 4000 miles, he estimated the Sun's diameter as 35 miles, similar to the size of Peloponnesus, on the Southern peninsula of Greece. For his heresy, religious authorities had him arrested, then banished forever from his home city of Athens [similar to the treatment of Galileo, 2000 years later].

In the third century BC, another Greek philosopher, Eratosthenes, used exactly the same set of observations to come to a completely different conclusion. Erathosthenes assumed that the Sun was so far away that the rays of light coming to us were parallel. He then calculated the diameter of the Earth, and with the same data, obtained the same result- the diameter of the Earth was 4000 miles. This shows that results are only as good as the premises on which they are built, for both calculated correctly, but the idea that the Earth was flat was wrong.

Similar observations of the Moon showed that the distance from the Earth to the Moon was about 60 time the Earth diameter. More recent measurements show that the Sun- Earth distance averages 149,597,893 kilometers, or approximately 93 million miles. This is the baseline unit, called the Astronomical Unit, or AU, used as a measuring stick for distances to other stars and planets. Because Anaxagoras got the distance to the Sun wrong, he also got the Sun's diameter wrong too. It is 1,390,600 kilometers across, which is 109 times the diameter of the Earth. The Sun's volume is about one million Earth volumes, and it has a density of only one third that of Earth, so its mass is one third of a million time greater than the Earth, 2x10^33 grams.

How much energy was being radiated by the Sun was demonstrated by William Herschel in the eighteenth century. He showed that the noonday Sun in summer, would melt a layer of ice one inch thick in a time of 2 hours

and 12 minutes. As this radiation is in all directions, the Sun provided energy enough to melt a sphere of ice, one inch thick and 300 million kilometers in diameter, in 2 hours and 12 minutes. If this ice was to contact the outer edges of the Sun, and still contain the same mass of ice, the layer would be one kilometer thick- and still melt in the same time interval.

In the 1700 s, attempts were being made to understand how the Earth could stay warm, and the age of the Earth. Early calculation put the age of the Earth as 75,000 years, and the Comte de Buffon, in France, was not convinced that the heat of the Sun was enough to keep the Earth warm, so he assumed that it began as a molten ball of rock, and had been cooling ever since. Newton, in his work, "Principia", calculated that a ball of red hot iron as big as the Earth would take 50,000 years to cool down. Buffon carried out experiments on iron and other substances of different sizes, and improved upon Newton's calculations. He showed that if Earth began in the molten state, it would have taken 36,000 years to cool to the point where life could appear, and a further 39,000 years to cool to its present temperature.

Buffon's work influenced Jean Fourier, a physicist and revolutionist in Napoleon's expedition to Egypt. Fourier developed a new form of mathematics to enable him to analyse interesting physical problems, such as how heat would emerge from the centre of the Earth to be radiated away to space on the outside. Fourier is now remembered for his Fourier transformations in mathematics, rather than his contribution to physics, but he contributed enormously in both. His calculations showed that the heat leaked out far more slowly than previously thought, and that Buffon's 75,000 years for the age of the Earth was more like 100 million years to cool to its present temperature.

Early calculation put the age of the Earth as 75,000 years...

In this same era, the Scotsman James Hutton became interested in the effects of running water on rock and soil. He was a wealthy farmer, after making his fortune inventing a manufacturing process for ammonium chloride [smelling salts], then turning to farming. He noted the rate of erosion of rocks, and pointed out how heat from the Earth's interior could push up mountain chains, and twist geological strata- but would do this over immense periods of time. His work was carried on by another Scot, Charles Lyell, who published a three volume work, "Principles of Geology". These books influenced Charles Darwin, on his voyages aboard HMS Beagle. He took the first volume with him, had volume 2 sent on to meet him on his voyage, and read the last when he returned from his adventures. The time scale for the natural weathering on Earth gave him the very long time spans that natural selection needed for his ideas of evolution of life. Lyell initially resisted Darwin's evolution theory, but eventually supported it, and became a firm friend of Darwin's. When Darwin was struggling against the opposition from religious leaders, Lyell put his reputation and standing behind Darwin when most needed.

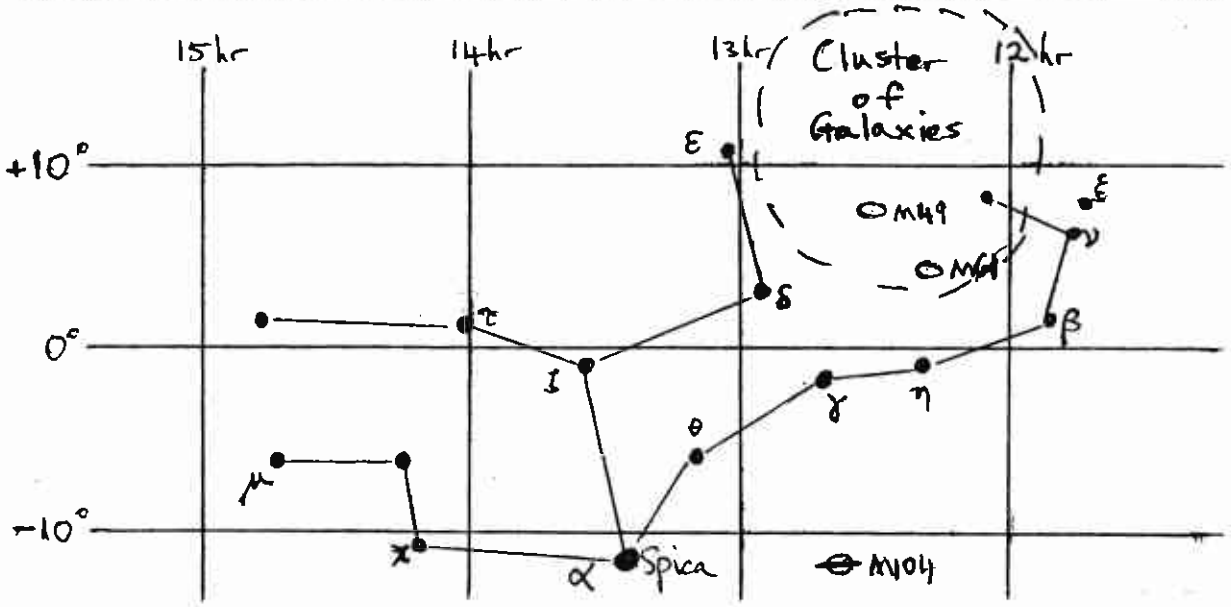
(End of Pt 1 – by John Casey)

Crater on Mars Could Swallow Up Mt Everest

Data from Mars Global Surveyor has created a global grid of Mars and is throwing up exciting discoveries. The work of Maria Zuber (from MIT) and her three team members is expected to give new insights about how Mars evolved over the past 4 billion years.

One special discovery is a crater with a rim of ejected material 1.6 km high that extends out to 4000 km from the centre of the basin. That's BIG! This basin (the Hellas basin) is itself 9 km deep, deep enough to submerge Mt Everest. ■

VIRGO - The Virgin



Virgo is getting ready to disappear over the western horizon, so now is a good time to check it out.

Virgo is quite large, covering an area approx. 45° x 30°. In fact, it is the 2nd largest constellation. (Do you know which is the largest?)

Why the Corn Goddess would be holding an ear of wheat and not a cob of corn is beyond me...

The images of Virgo are mixed. On one hand it is seen as the Goddess of Justice, holding the scales represented by Libra in the east. On the other hand, it is seen as the Goddess of Corn, Demeter, holding an ear of wheat (the star Spica). [Why the Corn Goddess would be holding an ear of wheat and not a cob of corn is beyond me.]

Virgo is best known astronomically for its huge cluster of galaxies, known as the Virgo Cluster. It is about 45 million l.y. away and is contained within an area of approx. 12° x 10° (if you overlook M104). There are thought to be over 3000 galaxies within the cluster, though most of these are too faint for amateur viewing.

Burnham lists 218 galaxies of 13 mag or brighter, most of which would require a good 200mm reflector to have a chance at viewing. Some of the brighter ones may be viewed by 150mm reflector on a dark moonless night.

The Stars:

α (Alpha) Virginis – Spica. As well as being the 16th brightest star in the sky, Spica also serves as a good yardstick for a 1st magnitude star. ie it is blue-white, 280 l.y. away and mag. 1.0. Spica is a 'helium' type star with a luminosity of ~ 2300 Suns.

Spica has many ancient references to the Persians, Syrians, Turks, Greeks, Romans and Egyptians. With some exceptions (the Arab name translates as 'The Unarmed One') most names relate to an ear of wheat. [13 hr 25m, -11°]

β (Beta) Virginis is an unexceptional mag 3.6 yellow star only 33 l.y. away. [11hr 51m. +2°]

γ (gamma) Virginis is recognised as one of the finest visual binaries. It is only 36 l.y. away and consists of two virtually identical white-yellow F type mag 3.65 main sequence stars. They have an orbital period of 169 years. γ's overall brightness is mag 2.8.

The binary orbit is exceptionally elliptic, with an eccentricity of 0.88. The distance between components varies from 3 AU at periastron to 70 AU maximum.

At present, they are approaching each other and at their closest in 2005, you'd need a 250mm aperture to split them. At present (1999) a 100mm+ aperture will be needed.
[12 hr 42m, -1°]

δ (Delta) Virginis – an unexceptional mag 3.6 red giant about 260 l.y. away.
[12 hr 56m, +3°]

ε (Epsilon) Virginis – Vindamiatrix 'The Grape Gatherer'. A G9 Class yellow giant, mag 2.8, about 100 l.y. away. ε is a good marker for locating the Virgo Cluster of galaxies. The cluster falls halfway between ε Virginis and β Leonis.
[13 hr 2m, +11°]

The Virgo Cluster of Galaxies

Where does one start? I suggest you start with a reputable chart which lists all the 13th mag or brighter galaxies. Burnham's Celestial Handbook, Vol 3, p2075 shows a good map of the central part of the Cluster.

This article will limit itself to some of the Messier numbered galaxies, of which there are 16. For the Messier scalp hunters, those found in the Virgo Cluster are: Ms 49, 58, 60, 61, 84, 85, 86, 87, 88, 89, 90, 98, 99, 100, 104.

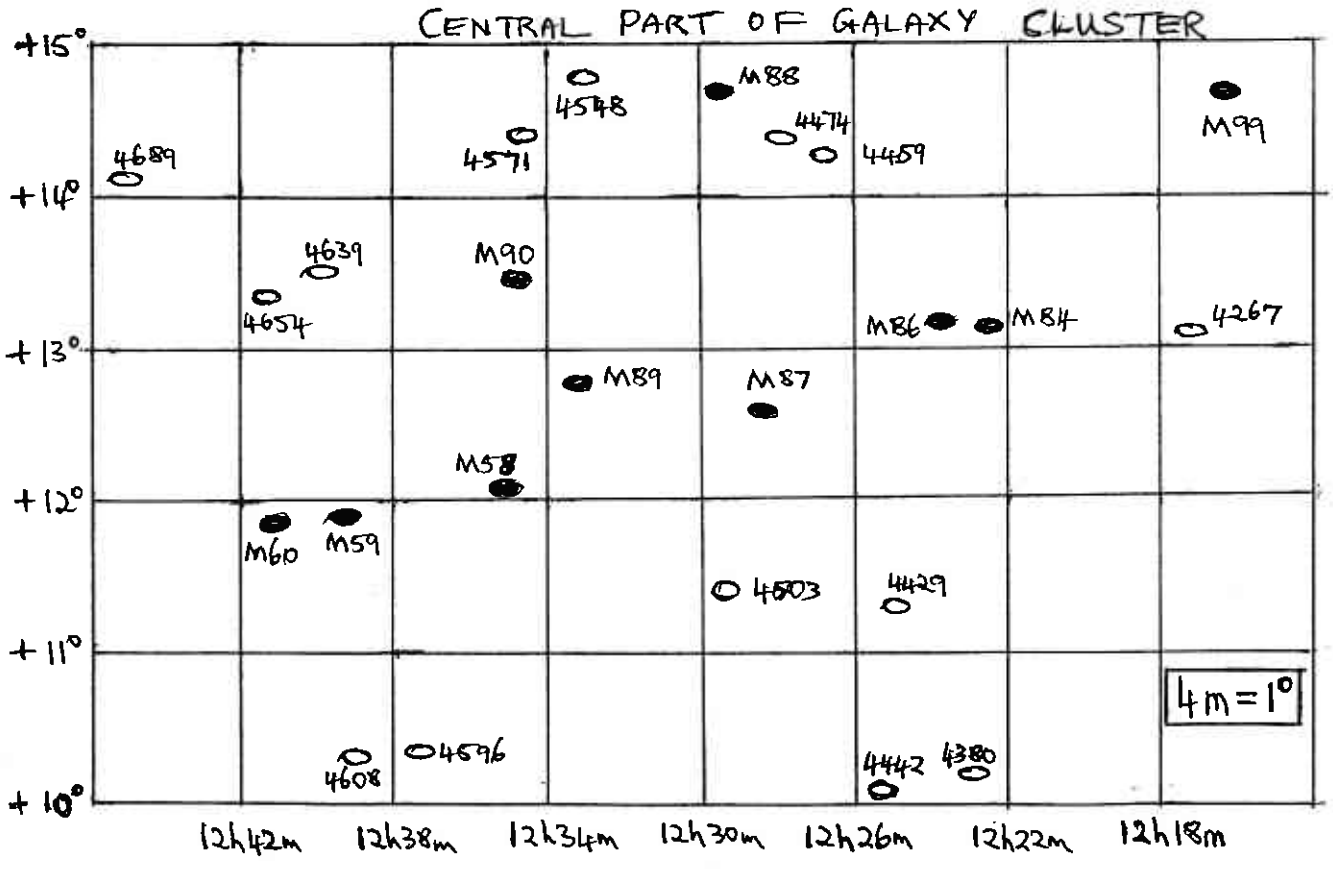
See the diagram showing approx. positions of the Messier galaxies. Note: low power is best for viewing these faint objects, as well as a clear, dark sky.

See also the table giving all the Virgo Cluster RA/Dec positions.

M49 – an 8th mag elliptical galaxy. It should be visible in a 75mm scope and it is one of the brightest and largest members of the Cluster. It is thought to have an overall mass of about 5 times that of the Milky Way.

M58 – a fine example of a compact barred spiral.

M59 – 11th mag elliptical, recorded by Messier in 1779.



M60 – 10th mag. elliptical. It forms a close pair with a bright spiral galaxy NGC4647. M60 is one of the largest elliptical galaxies known.

M61 – a large 10th mag. face-on spiral galaxy.

M84 & M86.– a bright pair of elliptical galaxies only 17' apart.

M87 – a giant elliptical galaxy, one of the largest in the Cluster. Celebrated as both a radio and X-ray source, and its spectacular jet of ejected material.

M89 – a large elliptical galaxy resembling M87 but a bit smaller and about 1 mag fainter.

M90 – a spiral galaxy inclined toward us, giving it an elongated appearance.

M104 - the well known Sombrero Galaxy. Although counted as part of the Virgo Cluster, it is well separated from the main bunch by 20°, near the border of Corvus. Easily recognised (at least in photos) by its extra dark horizontal band. It is a good example of a galaxy seen almost perfectly edge on.

So there's plenty to look for at your next dark star night.

Bob Bee ■

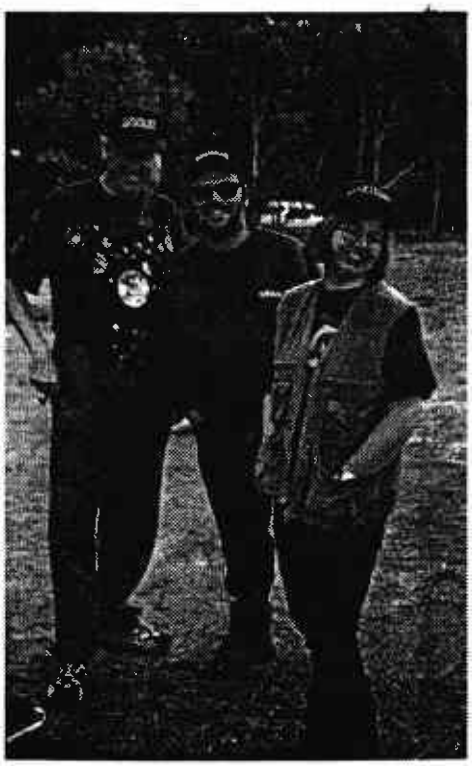
Galaxy	NGC	Mag.	Type	Location (RA, dec)
M49	4472	10.1	E3/E4	12hr 27m 3s, +8° 16'
M58	4599	10.5	Sb	12hr 35m 1s, +12° 5'
M59	4621	11.0	E3/E4	12hr 39m 5s, +11° 55'
M60	4649	10.0	E1/E2	12hr 41m 1s, +11° 49'
M61	4303	10.2	Sc	12hr 19m 4s, +4° 45'
M84	4374	10.5	E1	12hr 22m 6s, +13° 10'
M85	4382	10.5	Ep/S0	12hr 22m 8s, +18° 28'
M86	4406	10.5	E3	12hr 23m 7s, +13° 13'
M87	4486	10.1	E1p	12hr 28m 3s, +12° 40'
M88	4501	10.5	Sb	12hr 29m 5s, +14° 42'
M89	4552	11.0	E0	12hr 33m 1s, +12° 50'
M90	4569	11.1	Sb	12hr 34m 3s, +13° 26'
M98	4192	11.0	Sb	12hr 11m 3s, +15° 11'
M99	4254	10.4	SC	12hr 16m 31s, +14° 42'
M100	4321	10.4	Sc	12hr 20m 4s, +16° 6'
M104	4594	8.2	Sa/Sb	12hr 37m 3s, -11° 21'

Who are these 3 Amigos?

Caught at the Ilford Star Camp are our own Bobbie and Peter Elston and telescope maker extraordinaire Don Whiteman

Such smiles! Are they going to share the joke with us?

(Photo by Geoff Zenner Of ASNSW)



SECTION LEADERS

The following members have offered themselves as leaders (or coordinators) of those members with special interests in particular fields

DEEP SKY:
Pete & Bobbie Elston
Phone 02 46474491
e-mail:
eclipse@lightstorm.com.au

ASTRO COMPUTING:
Daniel Ross (02 9790 5838)

AMATEUR TELESCOPE MAKING: Dick Everett
Phone 02 96051564

COBBITTY OBSERVING SITE: Noel Sharpe
Mobile 0410 445 041 for checking field conditions.

TELESCOPES – NOVICE TO INTERMEDIATE:
Noel Sharpe

TELESCOPES – ADVANCED: Peter Druery.

MACDOB, the Society's own 6" Dobsonian telescope, is yours for the borrowing if you are a financial member of MAS.

It's a great scope to learn on. Very easy to use, with finger touch controls. Even our experienced scope owners are surprised by the views offered through MacDob.

If you are toying with the idea of buying a scope, why don't you borrow MacDob to get a feel for a reflector, what you can see with it, and how it feels to use.

But be warned, once you've used our 6", you'll want to go out and buy your own (or maybe even make one. See Dick Everett about that.)

To borrow MacDob, see Bob Bee at a MAS meeting or call him at home on 46251623.

Borrowings usually go from meeting to meeting, and you are encouraged to bring it along to the set Cobbitty nights.

There is no hire cost, but you are invited to make a donation (no set amount) to reflect the pleasure you gained from the scope. This goes toward the upkeep of the instrument.

Q&A

The Committee and Editor are still waiting in breathless anticipation for the first *Question* from a member to form the basis of an informed *Answer* to be published in the Journal. It doesn't have to be a world shattering question, just anything about astronomy or telescope hardware which you'd like an answer to, and which may interest others too. Send your question to Editor Bob Bee.