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## Vice Presidents Report

Daniel Ross

Good evening and welcome to our August meeting. With our illustrious leader not with us at the minute, I am left to fill a big pair of shoes this month.

Firstly, we all wish Ian Cook the best and a big "get well" as he recovers from illness and we hope to hear his talk on "Everybody's Favourite Star" at a later date. The messages on the forums have been appreciated.

Filling in will be a small talk and update on the Mars Phoenix Explorer and the continuation of the DVD "In the Shadow of the Moon" from last month.

Secondly, congratulations to all our winners from last month's guessing competition (winners are published in Rogers Report on page 3).

Next, I would like to thank our speaker for July, Chris Malikoff for his presentation on the new MAS website;

**"[www.macastro.org.au](http://www.macastro.org.au)"**

If you have not been to the website yet, I highly recommend it. We have had a fair few members sharing their knowledge, expertise and humour throughout the forums.

All the section leaders have a forum area to help you with particular problems. So don't be shy, and if you can't get to a computer, catch them at a general meeting.

It appears that the next opportunity for the open night will be in October, so please visit the website for further information.

## MAS Committee

**President**  
John Rombi

**Vice President**  
Daniel Ross

**Secretary**  
Roger Powell

**Treasurer**  
Dick Everett

**Webmaster**  
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**Prime Focus Editor**  
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## Guest Speakers

For the rest of the year will be

- September:**        **Andrew Jacob**  
                              **(University of Sydney).**  
                              **"Cepheid Variable Stars "**
- October:**            **Dr. Lisa Harvey-Smith,**  
                              **Postdoctoral Fellow**  
                              **School of Physics,**  
                              **Massive Stars: "Live Fast & Die**  
                              **Young"**
- November:**        **Dr. Greg Madsen,**  
                              **University Postdoctoral Fellow**  
                              **School of Physics –**  
                              **The University of Sydney.**  
                              **"How does our Galaxy work?"**

## Need Help

We will be holding our annual Observing night for the students of International House (Syd Uni) on Saturday August 23<sup>rd</sup>, we need as many scopes on the field as possible.

There will be approx 80 students, as well as Jessica Carroll (director of I.H.) I.H. will provide us with dinner. I hope you can join us as well.

While the cats away,  
Daniel Ross.

## **Observing Dates**

### August

18/08/08 General Meeting  
23/08/08 The Forest  
30/08/08 Stargard

### September

15/09/08 General Meeting  
20/09/08 Stargard  
27/09/08 The Forest

### October

20/10/08 General Meeting  
25/10/08 Stargard

### November

1/11/08 The Forest  
17/11/08 General Meeting  
29/11/08 Stargard

### December

20/12/08 Stargard  
27/12/08 The Forest  
TBA - Xmas Party

## **Prime Focus Article Submission**

Deadline for article submissions for the  
September edition of Prime Focus is

**Monday 8<sup>th</sup> September 2008**

All Articles can be submitted via email  
[cyberpiggy@optusnet.com.au](mailto:cyberpiggy@optusnet.com.au)  
Or via snail mail to the MAS Postal  
address

Thanks to all the contributors  
for this month.....

## MAS Website

Check out the new MAS website

<http://www.macaastro.org.au/>

Prime Focus now available on-line.

Take part in the members' forums

Keep updated with all Society News



## Secretary's Column

Roger Powell

All members will be disturbed at the news of Ian Cook's sudden illness. He has been in Campbelltown Hospital recently, following a heart attack.

Ian has always been a very active and knowledgeable member of MAS since the Society's inception in 1996 and was due to be our guest speaker again this month. He will need to take a back seat for a while but we all hope that he makes a full recovery and is back with us again very soon.

Meanwhile, the Society was very pleased to make a profit of \$523.00 from the recent Guessing Competition. Many thanks to Kate Johnston for being the Competition Organiser. Our winners were drawn at the last meeting and were:

<b>First Prize:</b>	Don Jephcott	(Telescope)
<b>Second Prize:</b>	Michael Wells	(Binoculars, donated by BINTEL)
<b>Third Prize:</b>	Geoff Young	(Book signed by Fred Watson)

This month, the Society has received two letters regarding the recent flurry of laser pointer legislation. Firstly, the Ministry for Police provided us with a summary of the recent NSW legislation and MAS is now seeking free registration by the NSW Police as an astronomical society. This will enable our members with laser pointers to be exempt from applying for a personal possession permit.

Due to the fact that members of the Society will be covered by the Society's registration, the committee has decided to create a voluntary register of members who possess hand-held, battery operated laser pointers. Forms will be provided and should you wish MAS to keep your details on file, please fill one out and give it to me or send it to: PO Box 17, Minto, NSW 2566. In the event of a problem occurring between a member and the police, such a register may assist both parties.

The committee is also discussing the provision of membership cards for next year's membership, to assist in quickly identifying membership of a registered astronomical society to police.

Secondly, the Federal Minister for Home Affairs, Bob Debus, has written to advise us that Australian Customs will be providing guidance to assist legitimate users in understanding the permission process for the importation of laser pointers.

Members may be aware that many other organisations are now making their magazines available on the web. For example, we receive ten printed copies of BINTEL's 'Night Sky' but if you miss out you can download it from their website at <https://www.bintelshop.com.au/NightSky/NightSky.pdf>

The committee has decided to provide dual publication of '*Prime Focus*' in both printed and electronic form. Accordingly, we are asking members, where possible, to visit the website before each monthly meeting and read '*Prime Focus*' online, instead of picking up the printed version at the meeting. If you are unable to do this, then the printed version will still be available as usual.

Our Editor, Kate Johnston, is also collaborating with Chris Malikoff to place online a full archive of every past version of '*Prime Focus*', beginning with 2008. This will be available in stages over the next few months (depending on how busy Kate gets with the Society's newest member, expected next month)! An annual index of the articles in each issue is also available, so that when you want to look (for example) for Bob Bee's article on Star-hopping to M88, you will easily find which issue to look at

# Ophiuchus

## The Snake Handler

Ian Cook

Flying overhead for those who can spot it this month is the ancient snake charmer.

There is disagreement about who the man and serpent or dragon represents. Among suggestions there is Hercules who killed Draco, or a King of the Getae named Carnabon, who killed a famous dragon, but Eudoxus and most authorities link the Serpent Holder to Asclepius.

Eudoxus was a prolific writer of scientific subjects in the fourth century BC. Among other things he mapped out the constellations, which was the main star reference for hundreds of years.

Asclepius was a son of Apollo with a nymph called Coronis, and was taught medicine by Chiron the centaur. Asclepius became the Argonauts' surgeon, sailing with them on the ship Argo, and he managed to bring back to life a number of people, including the son of King Minos of Crete.

It was after Asclepius tried to revive Orion, bitten by the scorpion; that Pluto began to complain. He argued that if Asclepius healed all the sick, he would have no souls to populate Hades. Zeus agreed; they could not permit men to be immortal, so launching a thunderbolt quick as a flash, Zeus ended Asclepius's life.

Zeus later put Asclepius in the heavens along with the Serpent, which had long been a symbol for renewed life, (shedding it's skin).

While the cult of Asclepius began in Thessaly, Greece, temples were built all over the place near healing springs. Ancient sculpture typically

shows Asclepius bare chested, attired in a long flowing cloak, and holding a staff with a serpent coiled about it.

This is perhaps the forerunner of the modern medical symbol of the caduceus.

The constellation Ophiuchus is thus found in the midst of Serpens, dividing the serpent into Head and Tail. The southern part of Ophiuchus dips into a very dense portion of the Milky Way, resulting in a great many deep sky objects.

The Bayer stars of Ophiuchus are fairly bright, five have a magnitude brighter than 3.0. The brightest star, alpha Ophiuchi, is better known as *Rasalhague*, meaning "Head of the Snake Charmer". This is a close star to us, at 54 light years away, and a celestial neighbour of Ras Algethi (alpha Herculis), which lies to the WNW five degrees.

Ophiuchus has a half-dozen visual doubles, and even more star clusters. In fact Ophiuchus has more globular clusters than any other constellation. Unfortunately many are small in size so have to be sought after carefully.

The region encircling *Rho Ophiuchi*, and stretching up to Antares, is also interesting. This area contains several dark clouds and nebulae that show the active formation of stars.



**Double stars in Ophiuchus:**

Ophiuchus has one of the finest collections of double stars, including several close visual binaries.

**Lambda Ophiuchi** is a rapid binary. 4.2, 5.2; currently the separation is 1.5", which is too close for me, but should be quite possible for you big scope people.

**Xi Ophiuchi:** 4.5, 9.0; separation 3.7". **Rho Ophiuchi:** 5.3, 6.0; separation 3.1".

**36 Ophiuchi** is a binary with period of 548 years, of two equal stars: 5.1, 5.1; 4.9".

**70 Ophiuchi** is another close binary with a period of 88.3 years. 4.2, 6.0. In 2000 the separation was 3.7".

**Struve 2276.** is a very beautiful fixed binary of two fairly faint stars: 7.0, 7.4; separation 6.9".

There are many other genuine binaries with separation angles too close for our small telescopes.

**Deep Sky Objects in Ophiuchus:**

There are seven Messier objects in Ophiuchus: M9, M10, M12, M14, M19, M62 and M107. These are all globular clusters.

**M10 (NGC 6254)** and **M12 (NGC 6218)** are nearly identical globular clusters, like tiny explosions of stars with dense cores, and easy to find with binoculars. M12 is eight degrees north of zeta Ophiuchi and two degrees east. M10 is 2.5 degrees SE of M12, with 30 Ophiuchi in the same field.

**M9 (NGC 6333)** is the smallest of the group, unresolved except in large instruments. The cluster is found 3.5 degrees SE of **eta Ophiuchi**. It is considered to be about 26,000 light years away.

In the same field are two more globular clusters: NGC 6342 (one degree SE) and NGC 6356 (one degree NE).

**M14 (NGC 6402)** needs a 20-cm telescope to resolve; it's more condensed than the preceding two, slightly fainter and more difficult to locate.

**M19 (NGC 6273)** is another very dense cluster, usually described as "oblate", meaning it's a bit egg-shaped. It is about 25000 light years away. M19 is two and a half degrees west of the bright double 36 Ophiuchi and less than a degree north.

**M62 (NGC 6266)** is six degrees SW of theta Oph (and four degrees south of M19); this is another non-circular globular cluster, a little brighter than M19. Both 19 and 62 are easier to find than described here as they are quite bright.

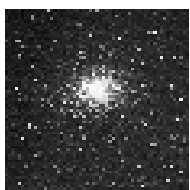
**M107 (NGC 6171)** is the faintest of the bunch and quite small but easy to find because of a bright guide star. It's three degrees SSW of zeta Ophiuchi.

**B78, the "Pipe Nebula",** is a naked eye dark nebula two degrees southeast of **theta Ophiuchi**, in a very rich area of the Milky Way. This is often described in magazines but I have never personally seen it. It's on my list for very soon.

**Barnard's Star** the most rapidly moving star relative to the solar system is also in this area but you will need an up to date finder chart to locate it.

This is a fascinating part of the galaxy and will reward searching with both binoculars and telescope.

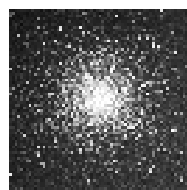
**Good seeing  
IC**



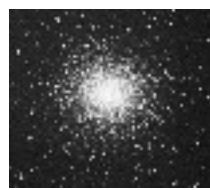
M9



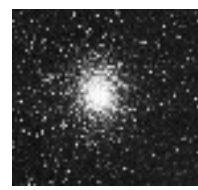
M10



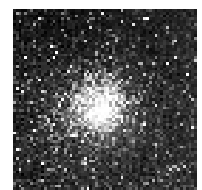
M12



M14



M19



M62

# Star Hopping to Messiers #7

## Ophiuchus (M9, 10, 12, 14, 19, 62, 107)

Bob Bee

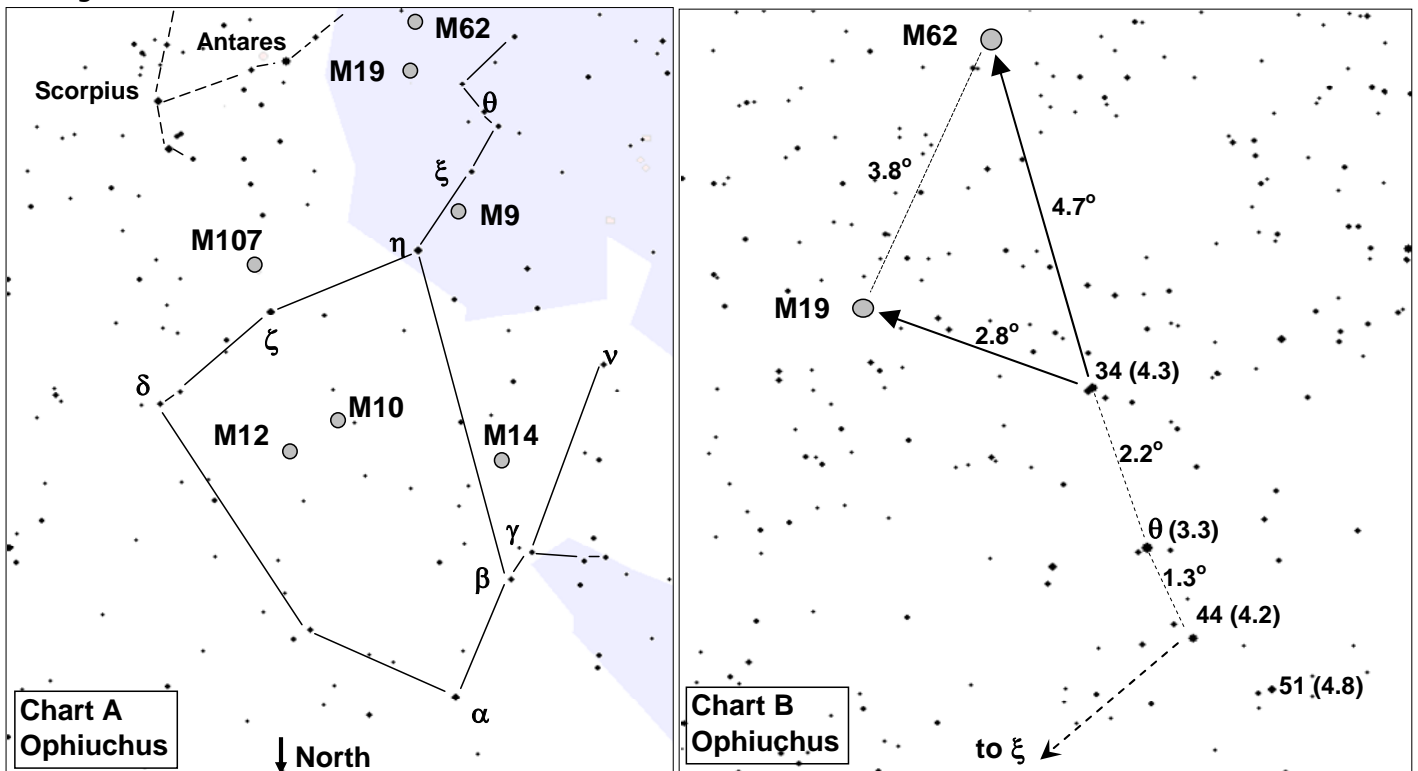
Ophiuchus, the healer encircled by a serpent, is a largish constellation found to the north of Scorpius and Sagittarius. Its 'shape' stars can be tricky to find but they mostly surround a very 'empty' part of the sky, at least to the naked eye. A good starter to locating Ophiuchus is to find Antares in Scorpius and head north from there.

Ophiuchus contains seven Messiers, all of them globular clusters and fairly obvious once found in a telescope. M10, M12, M19, M62 and possibly M14 should be visible in 50mm binoculars.

The magnitudes and size for each are shown in the table below.

Messier	M9	M10	M12	M14	M19	M62	M107
Type	GC	GC	GC	GC	GC	GC	GC
Size (')	9.3	15.1	14.5	11.7	13.5	14.1	10.0
Mag.	7.9	6.6	6.6	7.6	7.2	6.6	8.1

The general locations of the seven Messiers are shown in Chart A below.



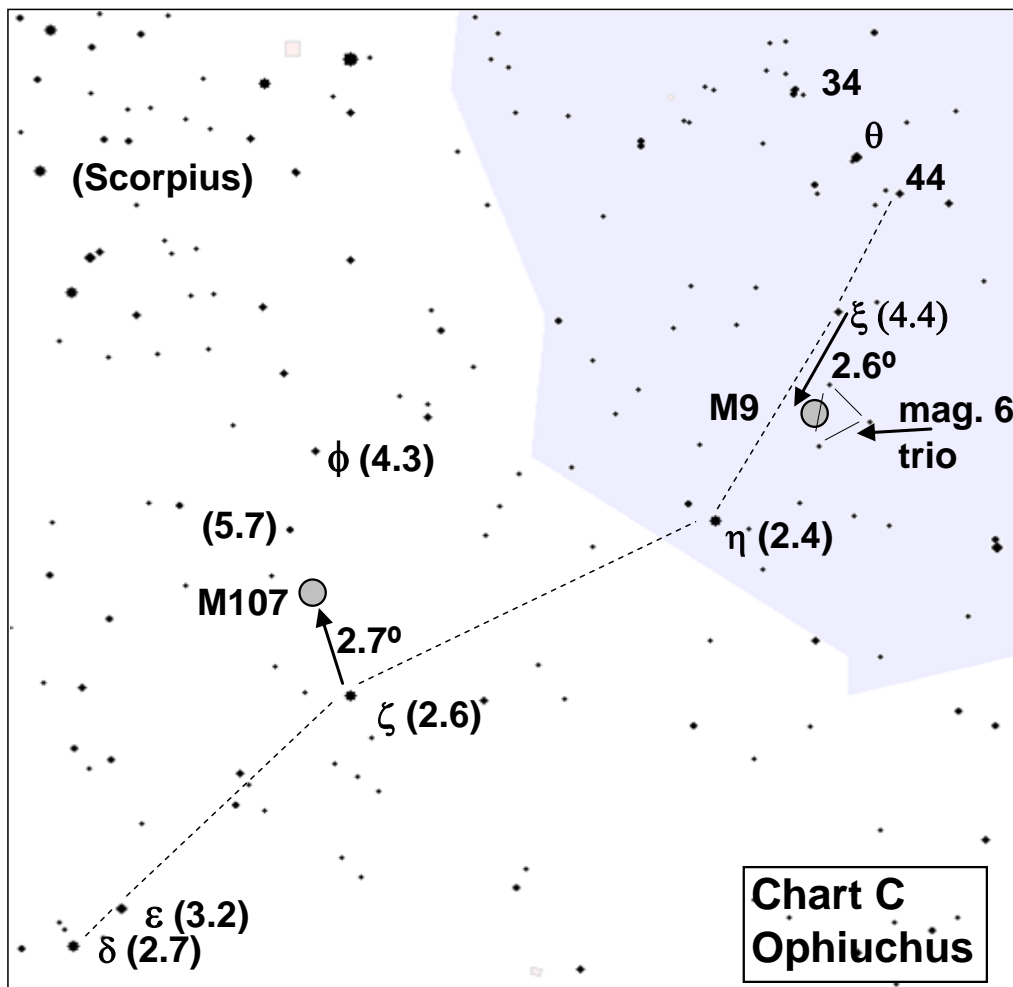
Let's start with **M19** and **M62** which are the closest to Scorpius. Notice from Chart A the zig-zag group of stars near theta ( $\theta$ ) and xi ( $\xi$ ) Oph. First locate  $\theta$  Oph. (mag. 3.3) and the two 4<sup>th</sup> mag. stars 34 and 44 in a line on either side. The line 34 –  $\theta$  – 44 is only 3.5° long and should easily fit in your finder scope (f/s) field of view (FoV). See Chart B below.

If you extend the line from  $\theta$  to 34 Oph by just over twice its length (4.7°), it should land you right on **M62**. If you extend it by exactly twice, you'll only be 18' out. Then check your lowest power main eyepiece, it should be in your FoV. How easy is that?

To locate M19, place 34 Oph and M62 at opposite sides of your f/s FoV, then imagine a right angled triangle in the direction shown on Chart B with the line from 34 to M62 as the long side. **M19** should lie at the right angle point, only 2.8° from 34 Oph. For a f/s with a 5° FoV, the triangle with M19, M62 and

34 Oph. should fit inside it. Move the f/s centre to the estimated M19 point and check the main eye piece. Got it?

Next let's find **M9**. Look at **Chart C** below.

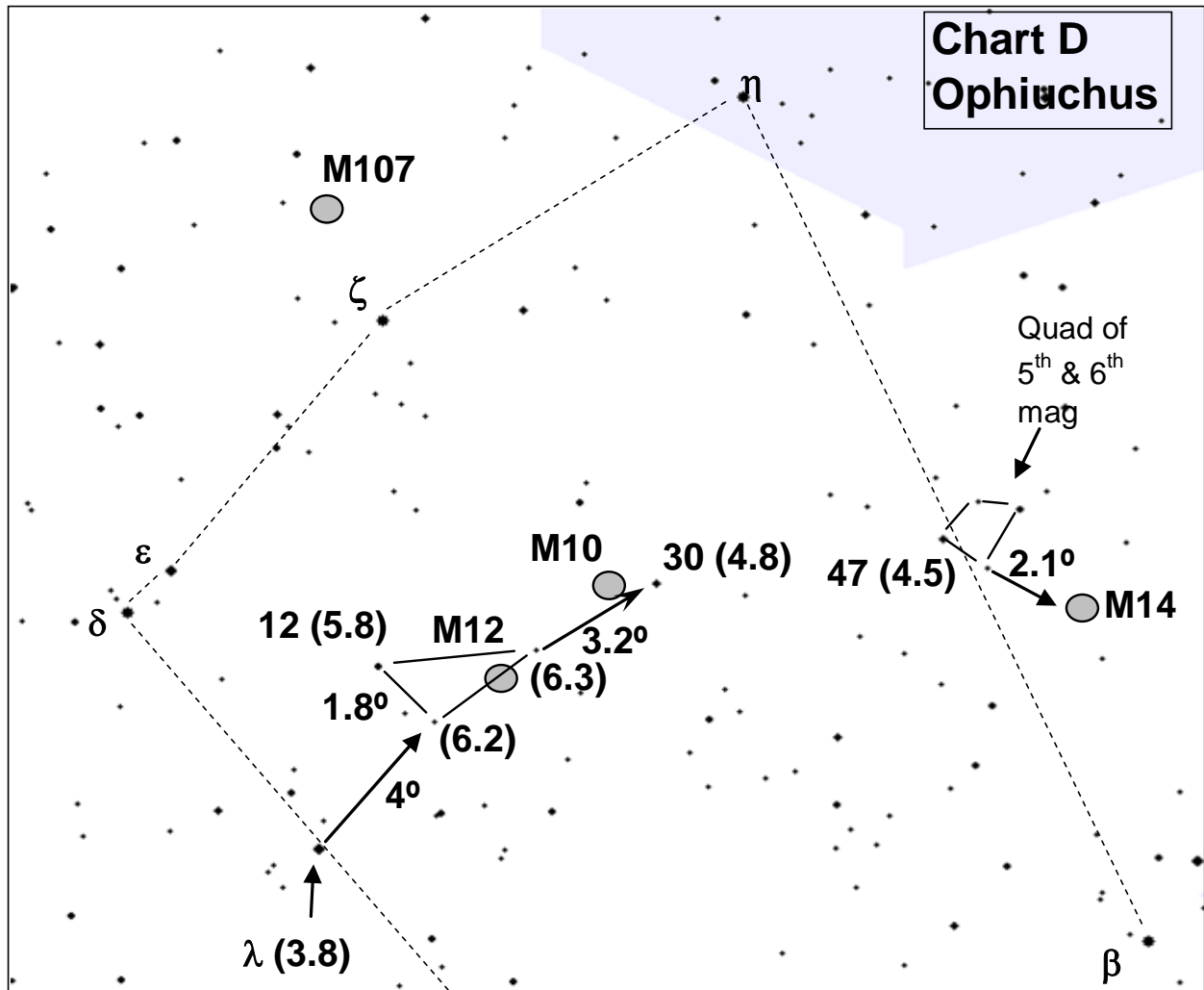


First identify  $\xi$  Oph. (mag 4.4) which is only  $3.3^\circ$  from 44 Oph. Place the centre of your f/s on  $\xi$  and move slowly towards  $\eta$ . Within  $2.6^\circ$  of  $\xi$ , you'll see a  $1.5^\circ$  long triangle of 6<sup>th</sup> mag. stars. Place your f/s centre midway between the two stars as shown and you'll be within  $12'$  from **M9**, visible in your main eye piece.

Finding **M107**. First identify the main stars  $\delta$  (mag 2.7),  $\zeta$  (2.6) and  $\eta$  (2.4) from Chart A. You can see that M107 is very close to  $\zeta$ . For a closer look, see Chart C.

Centre your f/s on  $\zeta$  Oph. Now move  $2.7^\circ$  (just over half a f/s FoV) away from  $\zeta$  towards Scorpius. That will land you on **M107**. As a more precise guide, place your f/s centre on  $\zeta$ , then move slowly toward  $\phi$  (mag. 4.3) which is  $6.2^\circ$  away (a bit more than a f/s FoV) towards Scorpius. On the way you'll see a mag. 5.7 star only  $4.4^\circ$  from  $\zeta$  (within the FoV). M107 is exactly on the line between this star and  $\zeta$ , about  $2/3$  the way ( $2.7^\circ$ ) from  $\zeta$ .

Next, let's find M10 and M12. Refer to **Chart D** below. Again, locate the top three stars  $\delta$  (with  $\varepsilon$  beside it),  $\zeta$  and  $\eta$ . Move  $7^\circ$  down (north) from  $\delta$  at right angles to the  $\delta$ - $\varepsilon$  line. This will bring you to a 3.8 mag. star  $\lambda$  **Oph**. Now move back eastwards (parallel to the  $\delta$  -  $\varepsilon$  line) by  $4^\circ$  to find a 6.2 mag star that is part of a right angled triangle of similar mag stars. (See Chart C.) This triangle is  $1.8^\circ \times 2.8^\circ$  in size, easily fitting in your f/s FoV. Place your f/s centre about 2/3 along the triangle's side shown and that will give you **M12**.



Now continue from the furthest star (mag 6.3) of that triangle by another  $3.2^\circ$  to a 4.8 mag. star (30 Oph), getting them both in your FoV. Place your f/s centre  $\frac{3}{4}$  along the line to 30 Oph. and about  $0.5^\circ$  above it to find **M10**.

Finally, M14. Refer to Chart D again. Guide stars for this are a bit thin in the sky but they suffice. The trick is to locate in your finder scope a nice quadrangle of 5<sup>th</sup> and 6<sup>th</sup> mag stars (one of its members, 47 Oph. is mag 4.5) about  $1.5^\circ$  across which is about  $12^\circ$  north of  $\eta$  Oph. Get this quad in your f/s. A hint is that 47 Oph. lies exactly half way between  $\eta$  and  $\beta$  Oph. There's not a lot else that bright in that part of the sky so if you persevere you'll find it. Then, if you simply extend the  $1.2^\circ$  long line between the two lower stars by  $2.1^\circ$ , it will land on **M14**.

*Again, all these directions are made easier if you know the actual FoV of your finders cope and main eye piece.*

**Good hopping!**



# Satellite Passes

Henry Swierk

For those who are still keen on looking up in the night sky to enjoy its wonders, this is something that does not require any special equipment, no late night hours and not even a trip to a dark site outside the town. A common "Mark-1" eyeball and basic information about the appropriate time is all you need to spot and follow these man made, space age high tech objects hurtling around the old Earth on low orbits.

Majority of observations can be accomplished from your average suburban backyard in early hours of the evening, shortly after sunset (or early hours of the morning shortly before sunrise, if you're that keen).

There are many satellite passes every day and those most noticeable and the easiest to spot are the well known International Space Station (ISS) and a family of about 80 communication satellites called Iridium.

Both, ISS and Iridiums, are easy naked eye objects, although they offer different viewing experience.

The ISS gracefully and smoothly sails across the darkened sky for a few minutes, often arching horizon to horizon. At magnitude range from -1 to -2 it's rather difficult to miss if you know the date, time and a general direction to look at.

The Iridiums on the other hand last over a shorter period of time but are quite spectacular and certainly eye catching events. These satellites are small in size but they are fitted with flat, highly polished aluminum antennas, which at the right angle reflect the sun light just like a mirror. As the Iridium satellite passes over, the moment when the angle of the antenna in relation to the Sun and your location on Earth is correctly aligned, it suddenly, strongly brightens up. These so called Iridium flares reach, when in favourite position, intensity (magnitude) of up to -7. This is well over the magnitude of a brightest star in the sky, Sirius at -1.5 and even the magnitude of Jupiter at -2.5.

So, if that still holds your interest, here are the instruction details to peg it down:

- Visit [www.heavens-above.com](http://www.heavens-above.com) . This is the web site for satellite predictions. It opens up with main page presenting various sections: "*Configuration*", "*Satellites*", "*Astronomy*", "*Miscellaneous*".
- In "*Configuration*", under "*from database*" option, select *Australia* and then in the "*Search String*" box type in the name of your suburb. Confirm it in the "*Search Results*" and your location coordinates are entered for further calculation. You can also do that via "*select from map*" option.
- Now, from the "*Satellite*" section select "*ISS*". It presents you with a table indicating dates, time, magnitude and altitude/azimuth of the predicted ISS passes over the next days or weeks. Clicking on the date also shows you the whole-sky chart with the ISS track.

Just note the date, time and a general direction to look at and you can't miss it.

Alternatively, select from the "*Satellite*" section "*Iridium Flares*", and a similar table will present dates, time, intensity (mag) and altitude and azimuth for the predicted flares.

Watching them is very exciting. Just go outside, orientate yourself and keep looking towards a general direction as specified. Soon you are likely to detect a small moving point of light. In a few seconds it brightens up dramatically outshining all the other objects in the sky around and then slowly fades away. The whole spectacle lasts about 10-12 seconds but it is very noticeable. It is particularly good for those passes indicated in the table with intensity level from say -3 to -7.

Next time, you may also try to spot the Space Shuttle on its way to or from ISS, or perhaps the Hubble Space Telescope passing overhead. At the right time they are visible too.

I hope you will enjoy this experience as much as I do.

## The Four Guardians of Heaven continues this month with No 3:

### *The Watcher Of The North.*

**FOMALHAUT** (Alpha Piscis Austrinus) marking the Ancient Winter Solstice

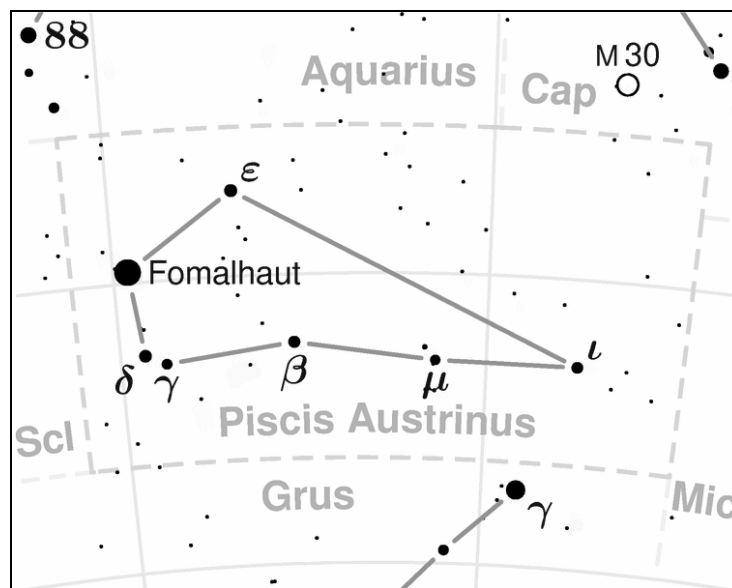
Ian Cook

This wonderful first magnitude star of the northern autumn ought to be pronounced correctly as "**Fom - Al - hoet**". It slowly slides in lonely grandeur directly above and a little to the north of us in Australia. As the Watcher of the North, **Fom-al-haut** then marked the northern winter solstice, whereas now it culminates at midnight the end of August, which is more like the **Spring Equinox** for us. That means if you look in the sky tonight, it's that bright star above the moon!

The constellation **Piscis Austrinus**, (the Southern Fish), is south of the well-known zodiacal figure Pisces, the Fishes. Old star charts show the stream of water from the Urn of Aquarius ending at **Fom al haut**.

The name means the "fish's mouth," and comes from a longer Arabic phrase meaning "the mouth of the southern fish." Early legends named  $\alpha$  **PsA** as the parent of the twin fish of Pisces. Alternate names are: the Greater Fish, the Golden Fish, or the Large Southern Fish.

The idea of a large fish drinking the entire outflow of the Urn of Aquarius was very widespread through the ancient Middle East.

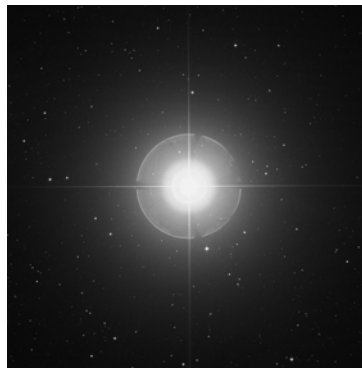


Internet picture

Fomalhaut was equated with the Persian god Zal, and was said to bestow charisma and to test the truth of our ideals. Ptolemy likened Fomalhaut's nature to that of Venus and Mercury i.e. fast, flirty, and quick to change mind or direction. Traditional astrology also believes the star to be quite volatile in effect — either very good or very bad, depending on the overall cosmic conditions prevailing.

**Fom al haut** was associated with immortality, and the Persians named this "the Solitary Star", perhaps, because the area surrounding it is largely devoid of bright stars.

The star is listed in the navigation tables of all sea going nations, and about 100 years ago, it was suggested as the Central Sun of the Universe.



DSS picture

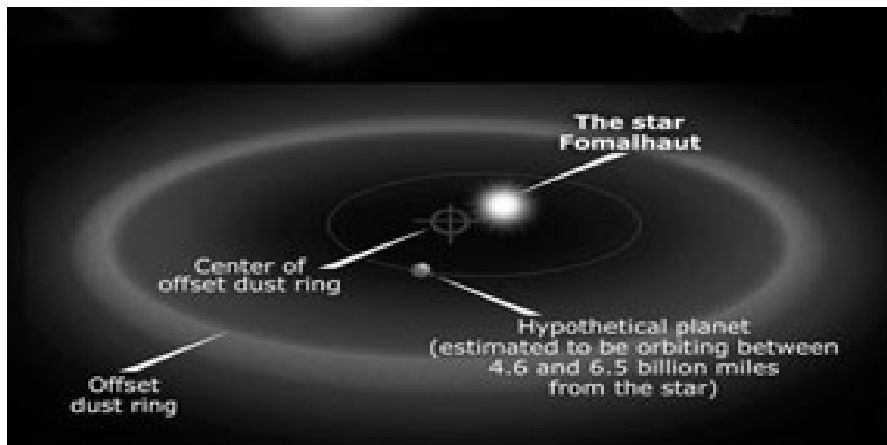
Though some sources have described Fomalhaut as slightly red, it is classified as a blue/white A class star with a surface temperature of about 9000 Kelvin. This is standard for "A" type stars, which have a majority of ionised chemical elements in their physical make up. If the star were located at a distance of 25 light years to us, **Fom al haut** would appear to be 10 to 16 times more luminous than the Sun.

Although it is almost the same distance as Vega, it is a full magnitude fainter to the eye because of lower mass, resulting in a lower surface temperature and smaller size.

At first it seems like yet another ordinary white "A type" star passing nearly overhead in temperate latitudes. However, in 1983 the orbiting satellite IRAS, discovered far more infrared radiation coming from the star than expected. Infrared radiation has wavelengths longer than red light and is a signature of a cool source.

The radiation is coming from a huge disk of material, four times the dimensions of our planetary system, that surrounds the star. The disk appears to be made of icy dust particles that have been warmed by the star. The planets of our Solar System almost certainly formed from the accumulation of dust in a similar disk.

A recent observation of Fomalhaut's dust disk shows a hole in the middle and that the star is offset to one side of the centre. This is what could be expected in a binary system or in the presence of other orbiting material.



From the Internet

Could the hole be the result of planets that have removed the dust?

Well we don't know as yet but closer scrutiny may reveal Fom-al-haut is preparing something special and not just guarding his quadrant of sky.

Are we being watched by other eyes as well as those of the solitary Royal Watcher of the North?

**IC Stars**

# Black Holes Ain't Holes – Part 3

## An essay on the problems perceived with the concept of black holes

Robert Zindler

(Editors Note: Robert Zindler has kindly offered the readers of Prime Focus sections of an essay he producing. Each month you will find the next extract from this essay.)

### DEFINITIONS AND DESCRIPTIONS (cont.)

#### Cosmology and Astronomy

Scientific astronomers assume as a matter of convention – and thus as a matter of faith? – that natural laws that are observed in the laboratory and as terrestrial *facts*, may be extrapolated to be valid for nearby and far distant observable galaxies with equal validity. This is considered to be a valid though essentially un-provable assumption.

Such extrapolated values are then designated as 'universal'. This is the underlying principle for what some scientists may call 'the frog's eye or inside-outwards view of the *universe*'.

Speculative cosmologists extend this assumption to unobservable regions in the *unobservable* parts of the cosmos. They then proceed with the process or technique of thinking 'in the mind's eye', which is the speculative cosmologist's equivalent of scientific astronomers' visual and technological observation. Cosmologists may call this 'the bird's eye or outside-inwards view of the *cosmos*'. The tools that cosmologists use, are *reason* and *logic*, while still scrupulously obeying natural laws and self-consistency.

This, for cosmologists, is perfectly legitimate and valid. This allows speculative cosmologists to develop hypotheses of considerable value, which, not only may contribute to the validation and consolidation of scientific astronomer's hypotheses and theories, but may, in fact, be the only way that some astronomer's conundrums or mysteries may be able to be resolved. Thus, although fundamentally speculative, cosmology – as equal partner with scientific astronomy – nevertheless may be able to contribute to the deeper understanding of nature by ever-searching human beings.

Scientific astronomers constantly probe scientific astronomical issues. Some astronomical research ventures deep into cosmological territories, that – by definition – are unobservable and thus remain cosmologically speculative. As both cosmology and astronomy are umbilically linked – so to speak – and are, therefore, equal partners, this is quite natural and legitimate.

#### Three groups of cosmological theories

Cosmological theories could be grouped into three categories:

- The standard cosmological model (SCM), which *ostensibly* represents 'the definitive' cosmological theory, but by its own description still remains in the cosmological realm.
- The *formative* sub-theories, which together form the basis for the SCM, some of which may well be formal scientific theories.
- The *derivative* sub-theories, which individually derive from the SCM.

There are reasons to suspect that some of the *formative* sub-theories, including the theory of black holes, may be flawed. If they can be demonstrated to be flawed, then this jeopardises the veracity and credibility of the main SCM and therewith the viability of any or all of the *derivative* sub-theories. This essay will eventually address only one of the *formative* sub-theories, i.e. black holes. Other potentially flawed sub-theories will be addressed in other essays.

..... STAY FOCUSED FOR MORE NEXT MONTH.....