



## Society News

### Monday Evenings

Due to holiday and other commitments the Observatory will be closed on Monday nights for the duration of the summer.

Training sessions will resume on Monday 29th August.

### Summer Barbeque

**Thursday 11th August 2011 19.30pm**

At the Observatory, Watery lane Newchurch

- Please bring your own food to cook on the BBQs
- The society will provide drinks, bread rolls and sauces
- So that we can have an idea of numbers please let a committee member know if you intend coming along

Thank you - Look forward to seeing you there.

### Telescope Competition

No entries to the recent competition! so the telescope will be used as a raffle prize at the Garlic Festival.

### Logo Competition



Committee decided to adopt the logo shown here to be used on all VAS paperwork, advertising and the web.

We had just three competition entries! One from a member and two from committee.

As the design was submitted by a committee member there will be no prize awarded - *I hope you like the new look!*

*Clear Skies!*  
**Brian Curd**  
*Observatory Director*

### VAS Website: [www.wightastronomy.org](http://www.wightastronomy.org)

Submissions or letters to New Zenith are always welcome and should be sent to:

**The Editor New Zenith**  
**35 Forest Road**  
**Winford**  
**Sandown PO36 0JY**

Tel: **01983 864303** or email: [editor@wightastronomy.org](mailto:editor@wightastronomy.org)  
Material for the next issue by the 6th of the month please.

### VAS Registered Office

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### Observatory Diary

<b>Monday,</b> 19.30hrs	<b>Members Only.</b> Telescope and night sky training.
<b>Thursday,</b> 19.30hrs	<b>Members and Public.</b> Informal meeting and observing.

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## Monthly Meeting Calendar 2011

Check the website for up to the minute information.

Travel for our monthly speakers is sponsored by:



Date	Subject	Speaker
24 Jun	The Transit of Venus 2012	Robin Gorman
22 Jul	Pluto	Greg Smye-Rumsby
26 Aug	Astro-Image Processing	Dr Jon Whitehurst
23 Sep	Accretion Discs? TBC	James Fradgley
28 Oct	Glow Bows and Haloes	Richard Fleet
25 Nov	Discs round Stars and Galaxies	James Fradgley

*All details correct at time of publication.*

## Lock Change

As mentioned in previous NZ, we have now changed the lock on the main observatory door. If you have an old key, please return it to Brian Curd and you will be issued with a replacement.

### My Mistake

OK, there were a few errors in last month's NZ!

1. Apologies to Dr Guy Moore for the problems with his article - seems I didn't do so badly with the equations but something went seriously wrong with other parts of the text.
2. Some of the internet links didn't seem to work.

A corrected version is available at:

[www.wightastronomy.org/basicfiles/LunarBiker.pdf](http://www.wightastronomy.org/basicfiles/LunarBiker.pdf)

**Sorry!**

## Stargazing Live

Following on from the success of our Wight Stargazing Live event that we hosted in January in conjunction with the BBC, the society has decided to host another one. Even though it was cloudy, over 100 people turned up.

**We intend to run a "Stargazing LIVE" event on Wednesday 21st September 2011 at the Observatory, Watery lane, Newchurch.**

- We once again have booked the pavilion for the evening from 5-10pm and we plan to run two 45min presentations
- We hope to have a minimum of 10 telescopes out, of various sizes and types.
- We will plan a Viewing Programme for the evening to demonstrate different ways of viewing the same object.
- Inside the Observatory, we shall use one of our rooms to present Astronomy DVD's, cinema-style.

**So, we would be delighted if you can help!**

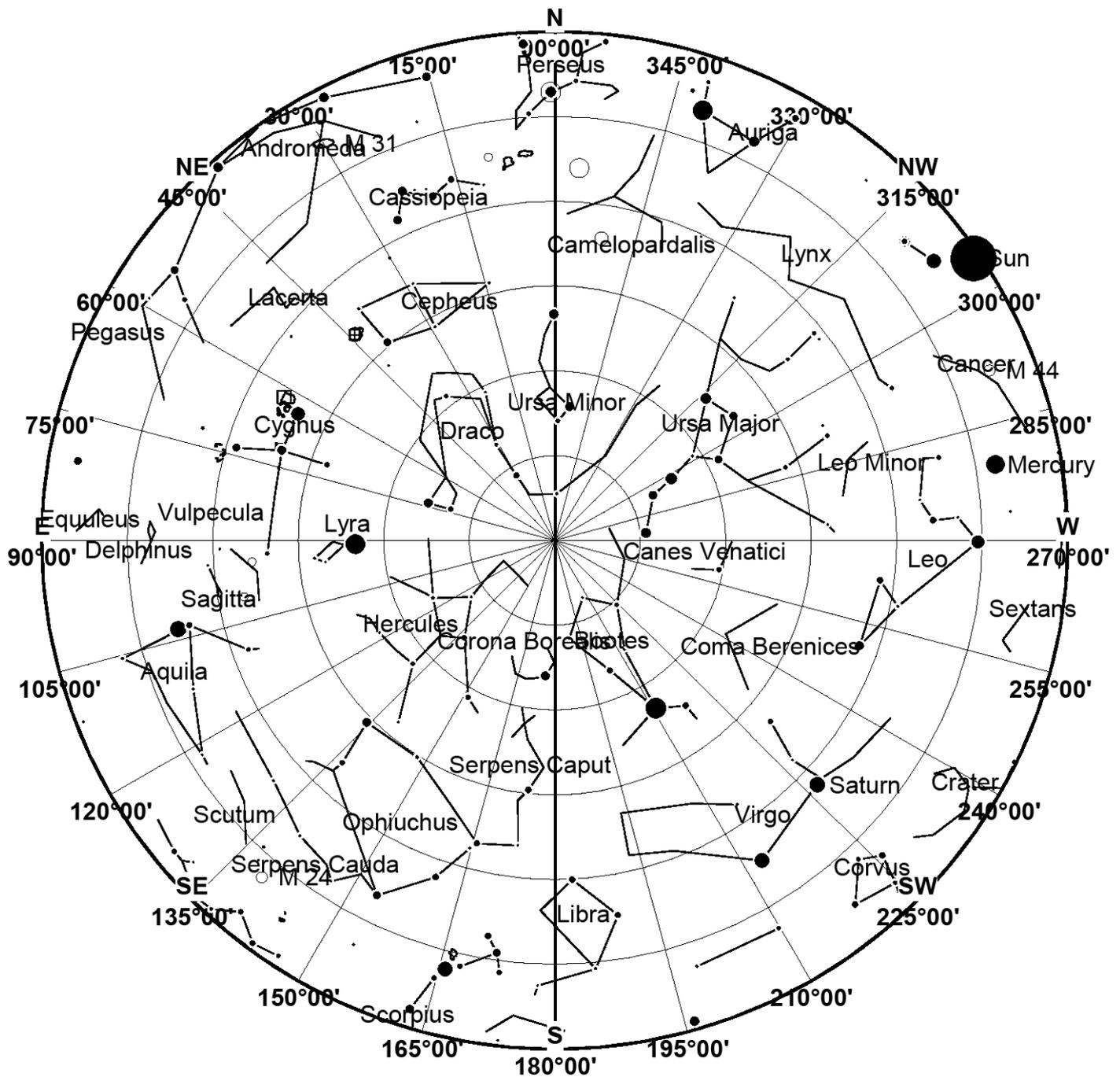
Can you:

- Bring your own telescope or binoculars? If so, what type and size would you bring?
- Come along and help to point out constellations?
- Help with the raffle/refreshments/car park duty/marshal doorways and exits to guide people? Or just be on duty in the Observatory.

**Please contact Elaine Spear if you can come along and help in any of the ways mentioned above - or if you have any other suggestions. Please reply a.s.a.p so we can have an idea of numbers and get a plan in place.**

*Elaine Spear - Programme Organiser  
progorg@wightastronomy.org*

# This Month's Sky Map



View from Newchurch Isle of Wight UK - 2100hrs - 15 July 2011



**The Omega Nebula**, also known as the Swan Nebula and the Horseshoe Nebula (catalogued as Messier 17 or M17 and as NGC 6618) is an H II region in the constellation Sagittarius. It was discovered by Philippe Loys de Chéseaux in 1745. Charles Messier catalogued it in 1764. It is located in the rich starfields of the Sagittarius area of the Milky Way. The Omega Nebula is between 5,000 and 6,000 light-years from Earth and it spans some 15 light-years in diameter.

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## This Month's Night Sky

### Moon Phases

New	1 <sup>st</sup> Qtr	Full	Last Qtr
1st & 30th	8th	15th	23rd

### Planets

#### Mercury

A poor summer apparition, for most of the month Mercury may be spotted by those with sharp eyesight and a good westerly outlook about 10° above the horizon at sunset.

#### Venus

Venus is on the other side of the Sun (too close to be seen).

#### Mars

Mars rises about 2 hrs before sunrise and through a telescope shows a very small disk that at just a few arc seconds across is too small to show any detail.

#### Jupiter

Jupiter is well placed for observation during the hours preceding dawn.

#### Saturn

As darkness falls Saturn is already well into the southwest so observation time is limited.

#### Uranus

Uranus is moving through the stars of Pisces, in an area of the sky devoid of bright stars that can act as signposts. This makes it somewhat more difficult to find than last year when it was very close to Jupiter.

#### Neptune

Close to the 5<sup>th</sup> magnitude star 38 Aquarii, about 2/3 the way between Ancha and Iota Aquarii, Neptune is a relatively easily found object despite its lowly magnitude.

### Deep Sky objects

#### M17 Omega Nebula RA 18h 21m Dec -16° 11' mag 7 -

If it were not for the Orion Nebula this would be the great show piece of the sky. Binoculars show the curved shape of this giant glowing gas cloud and stellar nursery. Some times called The Swan nebula, the swan swimming upside down through the Milky Way becomes more obvious through a small telescope.

#### M24 Sagittarius Star Cloud RA 18h 16m Dec 18° 43' -

Probably the densest mass of stars you will ever see is contained within this 2 x 1 degree patch of sky towards the centre of our galaxy. A slight thinning in the density of gas and dust allows us a small peak towards the galactic core.

This is an object for all instruments from a small pair of binoculars to a large telescope.

#### NGC6633 Open Cluster RA 18h 28m Dec 6° 34' mag 4.5 -

Although clearly visible in binoculars it is best viewed through a rich field telescope where the brighter members of this cluster form a rather wavy looking wedge of stars. If viewed before the sky darkens too much restricting the number of visible stars the scene is reminiscent of a miniature Leo, the backward question mark is a little indistinct, but the back and haunches are easily distinguishable.

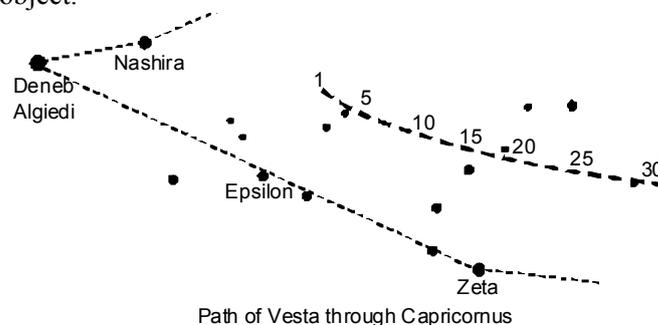
#### IC4756 Open Cluster R.A. 18h 39m Dec 5° 27' mag 4.5

- Located a short distance to the southeast of NGC6633 this cluster is also an easy binocular target, but is best viewed through a small low magnification telescope. There are a number of long chains of stars throughout the cluster the brighter ones form a rough five pronged Catherine wheel shape covering most of the cluster. The brighter foreground stars form a slight distraction when observing this cluster.

### Meteors

Delta Aquarids peak on the 20<sup>th</sup> with a predicted rate of 20 per hour.

Vesta (asteroid) rapidly crosses Capricornus this month. At magnitude 6.2 it makes a relatively easy binocular object.



Path of Vesta through Capricornus

*Peter Burgess*

## Garlic Festival 2011

### 20th & 21st August

Our major annual fund-raising event needs  
volunteer marshals.

If you can help, please contact  
**Richard Flux 883062**

## So you want to do Deep Sky Observing?

So you want to do deep sky observing? You've made a good decision, as deep sky is the most rewarding, yet challenging, aspect of amateur astronomy, there are literally thousands of objects out there to observe and it will keep you happy and busy for many years. Planets? There are only seven of them (if you ignore the demoted Pluto and the one we're standing on, the Earth). There's the Moon of course, but even that can become passé after a bit. But beyond the Solar System lies a whole new realm of nebulae, remnants of dead stars, star clusters, double stars and, beyond the Milky Way, billions of distant galaxies.

However, deep sky observing can be at times frustrating as most of the objects are faint and not that easy to locate, so here's some advice for those people who want to get into this most fascinating type of observing. This article is based on my own experiences, including a lot of trial and error, so I hope it will be of at least some use.

### **Use a telescope of 8 or 10" aperture**

If you are beyond the just-using-binoculars stage of observing, you're going to sooner or later want a telescope. A Newtonian reflector of 8 or 10" aperture on an alt-az (Dobsonian) mount is ideal, simply because these are perfect apertures to get you started being not too big to handle or store (once you get to 12" and above, things begin to get a little awkward). An 8" or, better yet, a 10" scope will show you all the Messiers, the Herschel 400, the Herschel II (the next 400), the brighter Index Catalogue objects and a great deal more in addition.

I began with a 6" dobsonian reflector but found it a bit small, selling it and getting an 8" within a year or two as I felt I'd exhausted its possibilities (in truth I probably hadn't at that time, but that was inexperience). An 8" may not sound much larger but you get 77% more light gathering power with it over a 6". As for anything less than 6", such as the little 4.5" reflectors, unless you are only a casual looker at bright deep sky objects such as the brightest Messiers, or you want a grab-and-go scope in addition to a bigger one, don't bother. Aperture rules in deep sky observing, the bigger the scope you can afford and move around, the better.

That said, however, and at the risk of sounding contradictory, someone just starting out in deep sky observing really should *not* rush out and get the biggest light bucket money can buy. For beginners 'not too small but not too big either' is the key to successfully starting out in deep sky observing. I've heard of people literally only in the hobby a few months buying themselves 16, 18 or 20" Dobsonians; in most cases this is plain old naivety and inexperience, although sometimes there are people with more money than sense and just have to start off with a bigger scope than everyone else. It's overkill and like

learning to drive in a powerful sports car or, probably more accurately in the case of a giant Dob, a tank and will inevitably lead to frustration due to the sheer size of these things. When I started deep sky observing it wasn't long before I got aperture fever, and drooled over the Coulter and Meade Starfinder ads in Sky and Telescope, but didn't succumb to it purely as I didn't have the money for anything larger but, more importantly, I wasn't experienced enough – just as well, because I know now that a big, heavy 12 or 16" Starfinder or Coulter Dob with its massive tube would never have been used, due to its sheer bulk, weight and awkwardness.

Despite saying that 'aperture rules' (and it does) quite a few serious and experienced observers don't go much larger than 12", simply because they are happy with their lot and don't want the hassle of a bigger scope. One guy I know in Texas uses an 8" SCT and he does some very advanced observing with it. A Dob of over 12" is a real handful and, for a beginner or inexperienced observer, too big to handle and use. But for experienced deep sky observers going beyond the Messiers and bright NGCs, however, big scopes are perfect for those prepared for the storage and handling issues that come with them. As the saying goes 'your mileage may vary'.

Over the years my scopes have gone from a 6" Dobsonian, to an 8" Newtonian, to a 12" Dob and now an 18 inch Dob. I used an 8" Newtonian (my own at first, then a borrowed one for a while when I was 'between scopes') for about 14 years before moving up in size. I daresay in a few years time, I'll go for something even bigger than 18" but then I've been doing this stuff for 19 years, I like big scopes and I am prepared for the handling and storage issues they bring.

### **Don't get bogged down with gadgets or imaging**

Too often I hear, and see on forums, people who have just got into astronomy wanting to take the plunge straight into imaging. Why? What's the hurry? Do some visual observing first – most established imagers began as visual observers and quite a lot of them are still visual observers, getting some eyepiece time in while the CCD does its thing. By going off the deep end and bypassing visual observing in favour of taking pictures, people are missing the best bits. Far too often visual observing is unfairly and wrongly dismissed as being a positively dinosaurian relic of the past and is bypassed or ditched in favour of the CCD chip or webcam. Visual observing can be – and often is! – frustrating but imaging is on a whole higher level of aggravation and the results often leave a lot to be desired, at least when it's me doing the imaging!

That said, for people in badly light polluted areas or those with bad eyesight, imaging or webcam observing is the most effective and sensible option. Visual observing's no fun if you're spending all your time hunting for stuff or not seeing it. I know that if, by some horrible turn of events I found myself living in a city again, or (heaven forbid) my

eyesight deteriorated, I'd definitely invest in a WATEC, Mallincam or other camera, it beats no observing at all! But, for those in less polluted areas or with decent eyesight, there's no excuse for not at least giving visual observing a go.

Keep it simple, at least at first. Learn your way around the sky by using a star chart and navigating your way to the objects by star hopping. When I began, I was itching for a 'Go-to' drive but, not being able to afford one was a blessing in disguise because it meant I got very familiar with the constellations, and I haven't come to rely on gadgets. If you can't star hop, haven't got a chart and your Go-to system breaks or the power supply fails, you're going to have to stop observing which would be, to say the least, frustrating and annoying.

Binoculars or a scope, a good finder, eyepieces, charts, pen and paper is literally all you need, and a lot of people – including me – find they need no more than that for the rest of their observing 'career'.

### **Get a star atlas, a Telrad and a good finder scope**

A decent star atlas is a must, particularly for those with larger scopes. If you have a scope of 8" or larger, you need at least Sky Atlas 2000.0 and, for those with scopes over 12", Uranometria 2000.0 and/or a charting program like MegaStar is essential, otherwise you'll not be able to locate the objects you have on your observing list.

A decent finder, 8×50 or larger, is also a must-have. Too small a finder, such as a tiny 6×30 one, is a recipe for annoyance because it will be no good for locating deep sky objects, especially the fainter ones.

Back in the 1970s, the Telrad finder was invented. This is a 1x finder, consisting of a plastic screen onto which is projected three red concentric circles. The inner circle is half a degree in diameter (around the size of the full Moon), the second circle is two degrees, while the outer circle has a diameter of four degrees. Many publishers of star charts include clear plastic overlays with the circles printed on them, to the scale of the circles on the actual device, and MegaStar allows you to print charts off with the circles on them. Telrads are brilliant, one of the best inventions in amateur astronomy, and once they are aligned with the scope, as all finders need to be, they are very accurate and easy to use. Finding things in the sky is so much easier with one.

### **Make notes and/or sketches**

The idea of making notes or doing drawings is appalling to some people because it might seem like drudgery but, to others, it's an essential part of the whole experience. I'm in the latter camp because I like looking back at what I've done and seen. I can open old notebooks at a particular place and that session will come right back to me, even down to the sounds I heard and the smells I've

smelt (barking dogs, distant rock festivals and the scent of foxes in the UK, howling coyotes and cooking burgers in the USA, the thumping of kangaroos in the dark and bush fires in Australia), even after a number of years. Notes and sketches don't fade over time but memories will and I'd hate to forget my favourite sessions and what I've observed over the years. It's also fun to look back at old sketches and notes and see how they hold up against the newer ones and see how your observing's progressed over time. Even bald, unadorned lists of objects are better than nothing, but not very valuable apart from keeping track of what you've seen. At the very least, make a note of the date, place, sky conditions, object name/designation and a brief description of its appearance – in time you'll be glad you did.

Sketching's fun and, as the old expression says 'a picture is better than a thousand words'. Even if you can't draw, have a go anyway. Deep sky sketching, in its simplest form, is about drawing dots and smudges and anyone can draw dots and smudges.

### **Use a dim red torch and not a white light**

Deep sky observing, more so than lunar or planetary observing, needs as much light as possible from the object and as little as possible in your surroundings. You are going to need to look at your charts and make notes or sketches, but white light will completely ruin your dark adaptation and make it impossible to see faint galaxies or nebulae or details in brighter objects. Deep sky objects are generally quite faint, indeed quite a lot of them are on the very edge of visibility, and even red light, if too bright, will make it hard, if not impossible to see them. Get a specially made red flashlight, which you can buy from astronomy retailers, or adapt a normal white one by covering the front with red acetate, cellophane or even red nail varnish (*if you're female you won't get any funny looks when you buy some, if you're a bloke you'll have to pretend it's a present for your wife/girlfriend!*). That way, you'll see your charts and notes without rendering the object in the eyepiece temporarily invisible.

### **Get away from lights if you can**

Deep sky observing requires as dark an observing site as possible, for the same reasons mentioned above – deep sky objects are rendered invisible by extraneous light. Artificial light pollution is a real menace to deep sky observers as, not only does it make it extremely hard to see the objects, it makes it difficult, if not actually impossible, to even find them in the first place. Light pollution (badly directed light going into the sky where it is wasted) from street lamps, (in)security lights, porch lights, car park lights, lights on business premises, etc, all combine to cause skyglow which wipes out all but the brightest stars. Even light from a window is a nuisance if it is shining out onto your observing patch.

If you can't get away from artificial lights, try and shield yourself and your telescope from them by erecting a screen, or putting bushes, trees or a building between you and them. Even better, if you can, take yourself and your scope to a darker site but this isn't always practical, and personal safety at a remote site is an issue, but if you've got a friend or relative with rural property and you can stay there, or your club has a dark sky site, then you're set.

### **Join your local astronomy society and the Webb Deep Sky Society**

When I was a beginner, if it hadn't been for Vectis Astronomical Society, with its experienced observers, I would not have learned as much as I did and the 'learning curve' would have been considerably steeper. You can get help and advice at societies and also try telescopes. Some societies, if not most of them, have a 'loaner scope' program, where members can borrow equipment from the club. That's a good way of trying a telescope out without making a financial commitment.

The Webb Deep Sky Society is the world's foremost society devoted to deep sky observing. Their quarterly magazine, the Deep Sky Observer, has articles and observing ideas.

Failing the above, join a forum, such as Cloudy Nights (*see below for link*). The people you ask for advice may not be with you in person but their advice is no less valuable for that. Forum information is usually more permanent than that found on personal websites, so it's usually easy to go back and find later.

### **Have a PLAN**

An observing plan is pretty important. Don't just go out with nothing in mind and jump aimlessly from object to object, you won't see much that way – make an observing list. If you're a beginner start with the Messier 110 list, then go on from there...the Herschel 400...Herschel II...etc, the choice is endless. The Astronomical League website (*see links below*) has 'observing clubs' and there you'll find some ideas for all sorts of observing programs. A definite plan of what you intend to observe before you go out will make a huge difference to what you see and the amount of observing you do.

### **And Finally...**

Despite all the advice above, this is a hobby, so the best advice anyone can have is *enjoy it, have fun.*

### **Recommended reading:**

- *Burnham's Celestial Handbook, Volumes 1-3* by Robert Burnham Jr.
- *Deep Sky Observing* by Steven R Coe
- *Deep Sky Observing, An Introduction* by Philip S. Harrington

- The *Deep Sky Companions* series by Stephen J. O'Meara
- *Deep Sky Wonders* by Walter Scott Houston (ed. Stephen J. O'Meara)
- *Messier's Nebulae and Clusters* by Kenneth Glyn Jones
- *Starry, Starry Nights* by Tom Clark
- *Steve O'Meara's Herschel 400 Observing Guide*
- *The Night Sky Observers Guide Volume 1 (Autumn and Winter)*,  
*2 (Spring and Summer)* by George Kepple and Glen Sanner, and  
*3 (The Southern Skies)* by Ian Cooper, Jenni Kay and George Kepple.
- *Touching the Universe* by Steve Coe
- *Visual Astronomy of the Deep Sky* by Roger N. Clark – if you can get hold of a copy! It tends to be rare and commands ridiculous prices.

A search on Amazon.com/Amazon.co.uk will find these books. Tom Clark's book *Starry, Starry Nights* can be found on [www.tomclarkbooks.com](http://www.tomclarkbooks.com).

### **Some links**

*The Astronomical League* - [www.astroleague.org](http://www.astroleague.org)

*Cloudy Nights* - [www.cloudynights.com](http://www.cloudynights.com)

*Drawing the Deep Sky* - [www.drawingthedeepsky.com](http://www.drawingthedeepsky.com)

*Ice In Space* - [www.iceinspace.com.au](http://www.iceinspace.com.au)

*The Webb Deep Sky Society* - [www.webbdeepsky.com](http://www.webbdeepsky.com)

*Uncle Rod's Astro Blog* - [uncle-rods.blogspot.com](http://uncle-rods.blogspot.com)

Googling 'visual deep sky observing' will find a lot more.

*Faith Jordan*



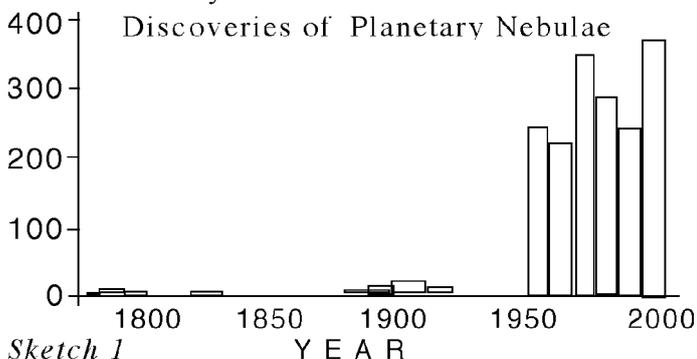
## Observing Planetary Nebulae

27 May 2011 Lecture report

### Owen Brazell - Abingdon AS

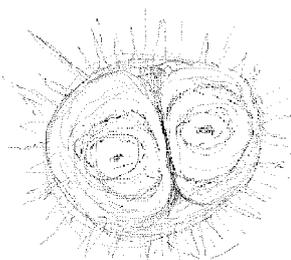
Owen Brazell read astrophysics at university, works in the oil industry, and, as an amateur, specializes in the visual observation of planetary nebulae. Very knowledgeable in his subject, including the physics of these spectacular phenomena, with his coverage of the history, one feels that Owen appreciates the difficulties encountered by astronomers more than a century ago, using telescopes with metal reflectors, through to the present, comparing historical drawings of planetary nebulae with how they look using the HST.

Note: Sketches are from notes and memories of images seen on screen. Sketch 1 gives approximate numbers of discoveries with year.



### Part 1: History

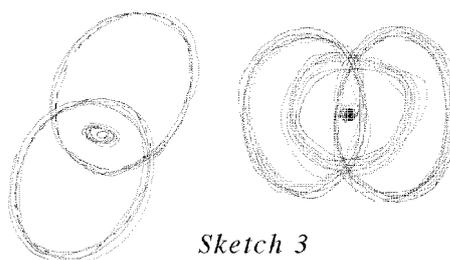
**Charles Messier** (1730-1817) lived in Paris, with no light pollution, but there were fires, smog and the misty river Seine. Interested in searching for comets, identified by their motion, much time could be spent wondering if various fuzzy spots with hints of distant planetary colours were shifting relative to the stars, or not. To spare people much time, he listed the ones which didn't shift, making his famous Messier Catalogue. M27, the Dumbbell nebula, visible with small instruments, was thought to be a fuzzy object he couldn't resolve, looking a bit like Jupiter, resembling a fading planet.



Sketch 2

Telescopes or binoculars are needed. M76, the Little Dumbbell, can look 'more like a Toby jug'. The Owl nebula, Sketch 2 relating to a British astronomer who obviously liked Ireland (more shortly) has an interesting history, and with a 4-inch telescope, there's no difficulty seeing it (M97 in Ursa Major).

**William Herschel** (1738-1822) was climbing on his very large telescope, when Health and Safety was not an issue. This epoch was the 'Botany of astronomy' - nobody had any idea of what was in the sky, 103 objects were 'collected and categorized', with difficulty. Planetary nebulae were placed in seven classes. Astronomers suffered from aperture fever, but a four-foot reflector made of speculum metal didn't hold a polish and was not a success. Herschel was responsible for many drawings of planetary nebulae, hiring people specially to make them. His sister Caroline assisted, making a catalogue, completed in 1798. Variety is the watchword, Sketch 3 merely shows two examples.



Sketch 3

Looking at the Orion nebula, Herschel thought he saw changes, but the stars were too far away to resolve. An object in Taurus, three arcminutes

in diameter, appeared to be a star with a fuzzy nebulous atmosphere, as if the star were being born - incorrect, but not a bad guess for the time. Herschel went to his grave believing in two types of object in the sky - the other sort being made of gas.

Herschel found 2500 objects. His son John combined their catalogues into one General Catalogue. With telescopes getting bigger, more was being seen, adding to potential confusion. Armagh Observatory Director, John Dreyer (1852-1926) made a New General Catalogue, using Herschel's numbers. By then 7000 objects were in the records. The first NGC appeared in 1895 a second in 1905. Early on, because of bad positioning, a single object could have multiple entries, one had twelve.

How a planetary nebula was defined wasn't clear. If it appeared in a list of them and nobody objected, then that's how it was classified. The Crab nebula mistakenly appeared in such a list for many years in popular books in the USA.

**Lord Rosse** (1800-1867) in Ireland had a giant 72" telescope. He gave the 'Owl nebula' its name (1845), and claimed he could resolve the 'fluids' seen by Herschel into stars, concluding that he was wrong about gases in the Universe. Meanwhile Padro Angelo Secchi (1818-1878) was drawing faint planetary nebulae and their morphology was gradually becoming recognized. The 'botany of astronomy' was turning into science.

**William Huggins** (1824-1910) in 1864, studying NGC 6543 the Cat's Eye nebula in Draco, discovers this nebula has an emission line spectrum, like the gas in a fluorescent tube, but with a huge difference. Modern information tells us that the gas of a planetary nebula is far thinner than the

most perfect vacuum we can make in the laboratory. So in one stroke Huggins proved that something exists out there apart from stars - made of thin gas. In contrast, the spectrum of a star is like a hot body, but contains dips called 'absorption lines'.

Hydrogen and helium were identified in the Cat's Eye spectrum but mysterious lines were also seen. It took fifty years to work out what they were. The new element apparently seen in nebulae became known as 'nebulium' but was a deep mystery. Although there were gaps in the Periodic Table, the properties of the missing elements did not tally with nebulium. In 1927 the reason emerged - the lines were due to oxygen at very low pressure when the long collision time between atoms allowed previously unobserved excited states to exist for longer, giving rise to 'forbidden lines'. They couldn't be made on Earth because vacuum pumps, wouldn't go down that far, and still don't, but high in the Earth's atmosphere such emissions occur during aurorae.

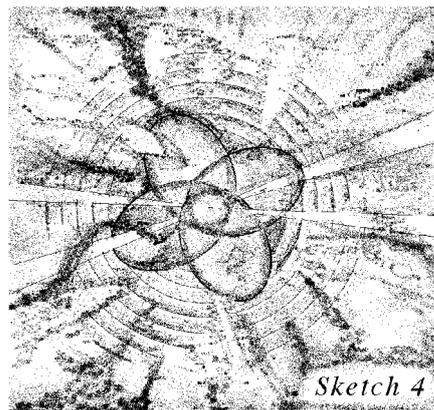
At the Lick observatory, the Crossly reflecting telescope was yielding photographic recordings on plates, difficult to compare with data from visual observers, so drawings were made from the plates to make comparisons.

## Part 2. Where and what are they?

Their density *on* the sky follows that of the Milky Way, so these recorded objects are in our galaxy. Ranges are very uncertain, like 5mpc + or - 5mpc (megaparsec), there is no absolute distance scale for them. The ones nearer to us within the annular thickness of our galaxy but away from the Milky Way *in* the sky, subtend large angles because of their proximity, one of them being four times bigger in angle than the Moon, another is half the size.

Until recently, we thought we knew how planetary nebulae form from a binary star pair. One explodes, forming a white dwarf with surface hotter than 40,000K, the expelled gas ploughing out into the dust. The orbiting pair trails the explosion into a structure, most usually with an axis of symmetry. The expanding gas cools, but very short wavelength radiation from the white dwarf excites the gas into making colours giving an emission line spectrum. The process takes 20-70 kiloyears. The gases expand at 20km/s, far slower than the gas expanding at several thousand km/s within nova and supernova. But there are difficulties with this picture such as:

- Why is there often no evidence of the other binary member?
- How to explain the variety of structures seen?
- Given all the white dwarfs in our galaxy, we should see 25,000 planetary nebulae, why do we see only 3,000.?



Now with observations in X-rays, ultra-violet and infrared, and the HST revealing equi-spaced rings indicating regular blasts of gas, *Sketch 4*, the mysteries have deepened.

Structural features like those of the Ant, Hour-glass,

Helix, Turtle, and Little Ghost nebulae are very difficult to explain. The Extreme Turquoise Halo Object Survey (ETHOS) has given amazing images of the high-galactic nebula now named 'Ethos 1'. The Gaia satellite will measure the distances to half a billion stars, and will help to pin down the scale.

## Part 3. Amateur observing.

Planetary nebulae provide targets for all sizes of telescope and they show natural colours. The invention of the nebula filter has made them popular. They mostly emit in the green, where our eyes are most sensitive, a good quality nebula filter lets this light through, attenuating most of the other light. Such filters are interference filters, sometimes made of 60 layers on a substrate, so they're expensive, whereas a light pollution filter is more broadband. To examine spectra, and confirm that an object is a planetary nebula, prisms can provide a sideways glance, but transmission grating eyepiece filters and direct vision spectroscopes can be used. The discussion was mostly about colours and filters.

Popular lists were discussed and books mentioned included '*Cosmic Butterflies*', Sun Kwok, Cambridge University Press, and '*Planetary Nebula*', by Hynes (expensive). Barry Bates (Chairman) mentioned books in the Observatory library on planetary nebulae. One comment overheard afterwards (the NZ editor) - "this talk was spot-on!"

### VAS library, see:

*Burnham's Celestial Handbook*, Dover, NY, 1978.

*NGC of Nebulae and Clusters of Stars*, 1888, and *Second Index Catalogue*, 1908, J.L.E. Dreyer, plus discussion therein.

*Webb Society Deep-sky Observer's Handbook*, vol.2 *Planetary and Gaseous Nebulae*, Lutterworth, 1979.

Data and image of Ethos 1 at [www.eso.org/~hboffin/ethos1/ethos1.html](http://www.eso.org/~hboffin/ethos1/ethos1.html)

Dr. Guy Moore

## THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

### Study indicates star may have been consumed by black hole

UC Berkeley astronomers believe they have discovered a star that fell into a black hole and was destroyed after a continuous burst of gamma rays was detected by a NASA satellite.

In a study published in Science Express on June 16, Joshua Bloom, an assistant professor of astronomy at UC Berkeley and lead author of the paper, said he believed what he and other astronomers witnessed was a collision between a star and a super massive black hole, which are located in the center of galaxies.

“The event that we just saw probably only comes around once per 100 million years per galaxy,” Bloom said. “Our idea is that it should never happen again from this galaxy, but we’re hoping one day we’ll be able to see it again in some other galaxy.”

Read more at: <http://www.dailyca.org/2011/06/17/study-indicates-star-may-have-been-consumed-by-black-hole/>

### Haleakala telescope finds new comet

HALEAKALA - University of Hawaii astronomers have discovered a new comet they expect will be visible to the naked eye in early 2013, the UH Institute for Astronomy announced Thursday.

The scientists originally found the comet using the Pan-STARRS PS1 telescope and automated software atop Haleakala on the night of June 5-6, and the discovery was confirmed to be a comet by UH astronomer Richard Wainscoat and graduate student Marco Micheli the following night using the Canada-France-Hawaii telescope atop Mauna Kea on the Big Island.

The comet poses no danger to Earth, institute officials said. But a preliminary orbit computation by the Minor Planet Center in Cambridge, Mass., found that in early 2013 the comet will come within about 30 million miles of the sun, about the same distance of Mercury to the sun.

Read more at: <http://www.mauinews.com/page/content.detail/id/550540/Haleakala-telescope-finds-new-comet.html?nav=10>

### Have you tried turning it off and on again?

NASA just disclosed details why the rover wouldn't accept any commands. They took a picture of the rover's built-in display which showed a windows screen and the text "press any key to continue".

## VAS 35th Anniversary Dinner

Thursday 3rd November 2011

The Isle of Wight College, Medina Way,  
Newport, Isle of Wight, PO30 5TA

Further details as we get closer to the event

### Observatory

For your own safety, when visiting the VAS observatory, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

### Articles Needed

New Zenith welcomes letters, articles or pictures related to all aspects of astronomy. Contributions to the Editor at the email or postal address on the front page.

*“If the human brain were so simple that we could understand it, we would be so simple that we couldn't.”*

Emerson M. Pugh

### Quotations

*“After sleeping through a hundred million centuries we have finally opened our eyes on a sumptuous planet, sparkling with color, bountiful with life. Within decades we must close our eyes again. Isn't it a noble, an enlightened way of spending our brief time in the sun, to work at understanding the universe and how we have come to wake up in it? This is how I answer when I am asked -- as I am surprisingly often -- why I bother to get up in the mornings.”*

Richard Dawkins

