

## Society News

### What Happens in August?

Well we all know don't we? of course we do, it's AGM time and that's when your VAS Committee all look forward to a great rush of nominations to take over their positions.

**This is your big chance**, please volunteer to join the Committee. Although it's not too onerous some of us need a rest as we have been in post for a number of years, any help is welcomed.

There's a Nomination form on Page 11. **Please consider joining us.**

**Please don't forget that the August AGM starts promptly at 7pm.**

### Venue Change for Monthly Meetings?

We are considering a change to our monthly meeting venue. With the improvements being made at the Newchurch Pavilion it seems to make sense to use that facility.

Free and easy parking on site, proximity of the observatory and a reduction in monthly costs are some of the reasons this is being suggested.

If you have any thoughts on the potential change please let a Committee member know or write/email me at the address in the top right box on this page.

### Observatory Work

I am pleased to say that we seem to be on the home stretch regarding changes inside the observatory. There's a bit left to be done but it shouldn't be too long before we are finished.

If any member has a couple of lengths of kitchen worktop lying around (600mm x 2320mm and 600mm x 3000m), preferably a dark colour, we could make very good use of them.

*Brian Curd*  
*Editor New Zenith*

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

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

**The Editor, New Zenith**  
**Carpenter's Cottage**  
**Dennett Road**  
**Bembridge**  
**Isle of Wight PO35 5QF**

Tel: **01983 872875** or email: [editor@wightastronomy.org](mailto:editor@wightastronomy.org)

Material for the next issue by the 6th of the month please.

The Vectis Astronomical Society and the Editor of the New Zenith accept no responsibility for advice, information or opinion expressed by contributors.

**Registered Charity No 1046091**

## Observatory Diary

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training. Please contact Martyn Weaver 07855 116490
Thursday, 19.30hrs	Members and Public. Informal meeting and observing

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## 2016 Monthly Meetings

Date	Subject	Speaker
Please check <a href="http://wightastronomy.org/meetings/">wightastronomy.org/meetings/</a> for the latest information		
22 Jul	Ultra High-Energy Cosmic Rays	Ellis Owen
26 Aug	AGM Starts at 7pm sharp William Herschel and the Rings of Uranus	Dr Stuart Eves
23 Sep	TBC	TBC
28 Oct	TBC	TBC
25 Nov	Stellar population Modelling	Dr Claudia Maraston

## Observatory Visits Booked

No July bookings so far

It would be appreciated if members could avoid using the observatory at these times.

## 40th Anniversary Event

VAS will celebrate it's 40th anniversary  
on  
November 12th 2016  
at  
**The Breeze Restaurant,**  
**Island Harbour**  
**Binfield, Newport**  
**PO30 2LA**

*More details on page 8*

## VAS Contacts 2014/15

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<b>Others</b>	Mark Williams & Nigel Lee

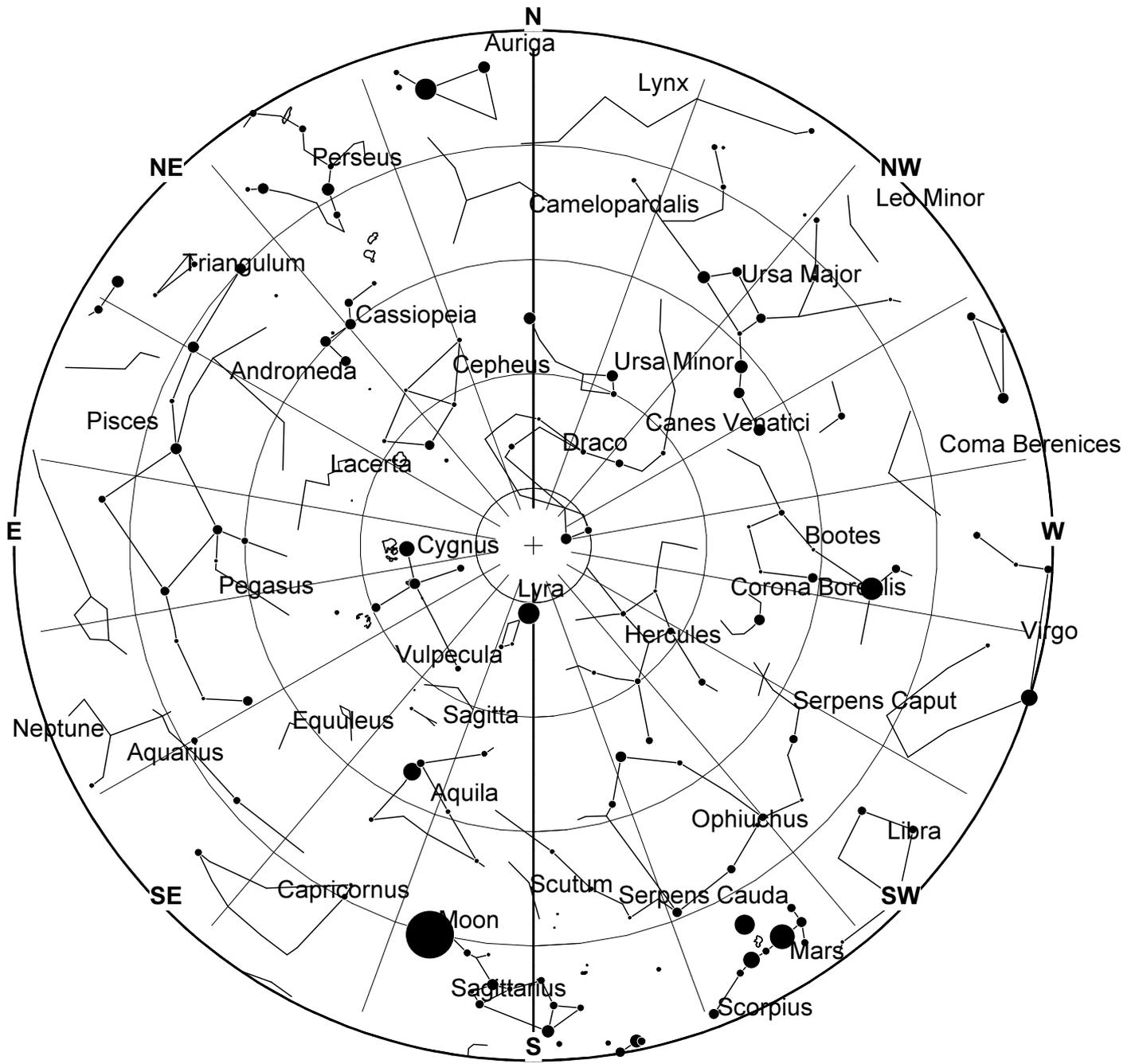
## Important

Members using the observatory outside normal Thursday meetings **MUST** enter a line or two in the Observatory Log Book.

On several occasions, lights, heaters and the Meade LX200 have been left on!

When leaving, please ensure all is secure and all lights, heaters and telescopes are **TURNED OFF**.

# August 2016 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 August 2016



**Perseid Meteor Shower:** The stream of debris is called the Perseid cloud and stretches along the orbit of the comet Swift–Tuttle. The cloud consists of particles ejected by the comet as it travels on its 133-year orbit. Most of the particles have been part of the cloud for around a thousand years. However, there is also a relatively young filament of dust in the stream that was pulled off the comet in 1865, which can give an early mini-peak the day before the maximum shower. The dimensions of the cloud in the vicinity of the Earth are estimated to be approximately 0.1 AU across and 0.8 AU along the latter’s orbit, spread out by annual interactions with the Earth’s gravity

*This article is licensed under the [GNU Free Documentation License](https://www.gnu.org/licenses/old-licenses/gpl-2.0.html). It uses material from the Wikipedia article “Perseids”.*

## August 2016 Night Sky

### Moon Phases

New	First Qtr	Full	Last Qtr
			
2nd	10th	18th	25th

### Planets

#### Mercury

Mercury continues the poor evening apparition started last month. It is very close to the horizon at sunset. For a few days around the 20th there is a wide conjunction with Venus and Jupiter. Use these brighter planets as a guide. Mercury is below and to the left of the brighter pair.

#### Venus

Although Venus is pulling away from the Sun it remains a difficult object being only at best 6 degrees above the horizon at sunset. Being so bright if you have a good view to the horizon and it is clear it will be visible for a short time but not at all suitably placed for observation.

#### Mars

Mars is now moving quite rapidly to the east against the star background. It starts the month against the stars of Libra and by the end of the month is well into Scorpius. Around the 24th it is less than 2 degrees above the bright red giant star Antares; the opposite of Mars. As the sky darkens you can find Mars in the south-south-western sky, and because of its eastern motion does not move to the west as fast as Saturn, the other planet in that part of the sky.

#### Jupiter

As the month progresses Jupiter will become progressively more difficult to see as it gets closer to the Sun. There is a challenging close conjunction with Venus on the 27th when the pair are separated by less than 10 arc seconds. At sunset they are only 6 degrees above the horizon.

#### Saturn

Like Mars Saturn can be found low in the south-south-western sky after sunset. It starts the month to the east of Mars and by the end of the month is above and to the west. Around the 24th Mars, Saturn and Antares are lined up above on another. Saturn is almost one magnitude fainter than Mars, but there are no other objects as bright in that part of the sky so are easily identified.

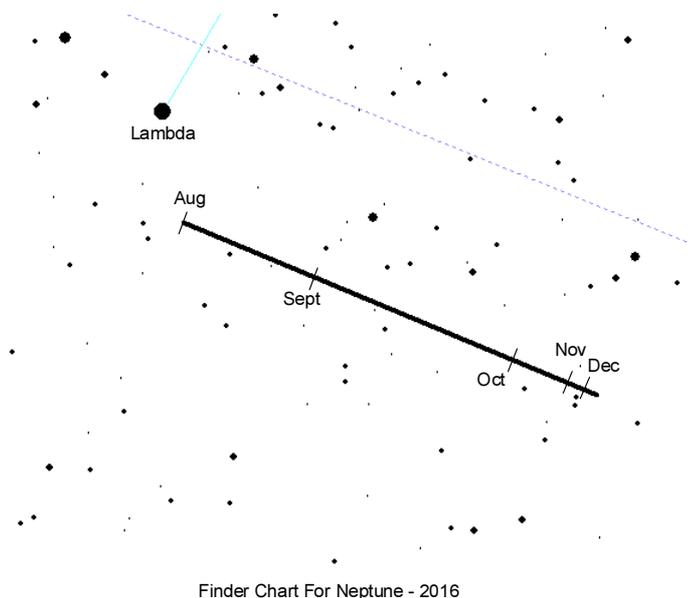
#### Uranus

Uranus can be seen in the hours before sunrise, but is still rather too low down for observation. Look for it between Omicron and Mu Piscium.

#### Neptune

Neptune starts the month about 2 degrees below the star Lambda Aquarii and gradually drifts west as the month progresses. The finder chart shows the path taken by Neptune for the remainder of the year. Its progress slows during late September and its path against the stars reverses in November. The chart is approximately the field of view of a pair of 10x50 binoculars.

Neptune is about magnitude 8 and the chart shows stars to below magnitude 9. The easiest way to be sure that you have found the planet is to observe over several nights to observe its movement against the stars.



#### Meteors

The Perseids meteor shower peaks this month at around 15:00 UTC on the 12th; before the sun sets so we will probably miss the peak. Don't let this put you off observing the shower the peak is quite broad, the whole shower lasts for weeks and rates can be quite high a day or so before and after the predicted peak time. The light from the waxing gibbous moon will be a minor irritation before midnight. The meteors will appear to come from radiant point in the constellation of Perseus which will be in the north east and this is where the meteors will appear their shortest, so look away by about 90 degrees to see the trails at their longest. High in the south east can be a good place to look.

*Peter Burgess*

## The Garlic Festival

*This annual event occurs on  
Sat-Sun August 20th-21st.*

As the largest show of its type on the Island it is an ideal opportunity to publicise the VAS and its activities. We traditionally exhibit with a couple of telescopes and a display in a small tent. There will be a telescope to raffle which always attracts considerable interest.



We can only do this if we have sufficient people to staff the tent. If you can spare at least half a day over the weekend I can arrange a rota to cover the opening times of 10.00 to 18.00. As an incentive you get a free ticket so can take a break and wander round the site – you may even meet the odd celebrity!



*Alex meets Kiki Dee*

We also supply a few Marshals for general duties around the site which generates useful income for the Society and helps keep subscriptions down!

If you are able to do either of these, please contact me on 883062 or 07503 212953, [richard.flux@iow.nhs.uk](mailto:richard.flux@iow.nhs.uk). Or see me at meetings or the observatory.

**Free  
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### Monitoring Climate Change from Space

Explore our planet from Space and learn how Earth Observation is used to monitor Climate Change, with this free online course  
<https://www.futurelearn.com/courses/climate-from-space>

### Moons

Explore the many moons of our Solar System. Find out what makes them special. Should we send humans to the moon again?  
<https://www.futurelearn.com/courses/moons>

### In the Night Sky: Orion

Course date to be announced  
Register your interest to receive an email for the start date  
Explore the night sky, discover how stars are formed, and find out about exoplanets, all through the constellation of Orion.  
<https://www.futurelearn.com/courses/orion>

### Gravity! From the Big Bang to Black Holes

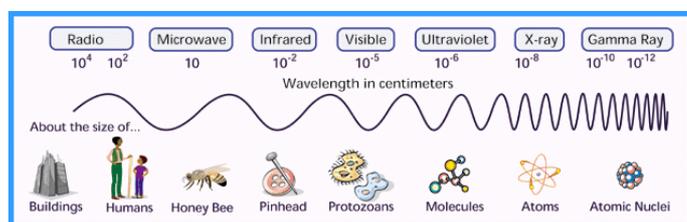
Course date to be announced  
Register your interest to receive an email for the start date  
Gravity runs the Universe. This free online course explains why, exploring gravitational waves, black holes and the Big Bang  
<https://www.futurelearn.com/courses/gravity>

## Monitoring Climate from Space Part 2

In part one we discussed Earth observation (EO) which is a collective term for the gathering of data and information about our planet's physical, chemical and biological systems through the process of 'remote sensing'. Remote sensing is the measurement of electromagnetic radiation (EMR) emitted or reflected by the Earth. This article looks at what is detected/measured and how.

The advantage of looking at earth from space is that earth orbiting satellites show not only regional detail about things happening, but how things can be seen in a much wider global context. They tell us how the different changes that are happening in some parts of the world, affect what's going on in other parts of the world. The other great advantage of satellites is that we can get data very rapidly from all over the globe in very remote places. The technology for satellites has evolved greatly in recent years, and provide us with the vital information we need to face big challenges like climate change, growing food for our growing population, the need to respond to disasters, and the ability to manage the finite resources on our planet.

### Electromagnetic Energy



When you tune your radio, watch TV, send a text message, or pop popcorn in a microwave oven, you are using electromagnetic energy. You depend on this energy every hour of every day. Without it, the world you know could not exist.

Electromagnetic energy travels in waves and spans a broad spectrum from very long radio waves to very short gamma rays. The human eye can only detect a small portion of this spectrum called visible light. A radio detects a different portion of the spectrum, and an x-ray machine uses yet another portion. NASA's scientific instruments use the full range of the electromagnetic spectrum to study the Earth, the solar system, and the universe beyond.

### Different Types of Earth Observation

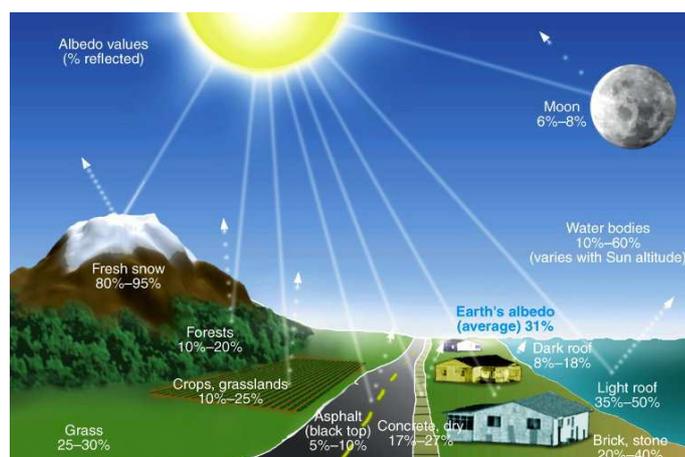
There are a number of towers on earth with instruments at the top, which measure energy fluxes and atmospheric concentrations of carbon dioxide and water vapour. Using these point-based instruments we can get incredibly detailed pictures of the exchanges of carbon dioxide,

energy and water vapour between different systems of the environment. This can be done at very high frequencies, but these measurements are only being made at the location of the tower. In order to put the measurements into context we can use aerial remote sensing.

This means putting instrumentation on aircraft, and flying them over a similar area, to make measurements of the temperature of various components such as rivers, vegetation, concrete and tarmac, and other measurements like the albedo, which is how much visible light they reflect.

This is quite logistically challenging and expensive to make. So the way we can measure much more continuously is to use satellite Earth Observation.

Using a combination of point-based, aerial and satellite imaging, we can put information into a coherent whole, and build on a picture of how this environment is changing and being modified over time. So, whilst we can collect highly detailed data at a point, and add to it information collected by aircraft, we can only do that every so often. Whereas information from earth orbiting satellites is available very repetitively over long time scales.



### Types of Instruments

With every sunrise, the Earth's surface is bathed in solar energy, some of which is absorbed and some of which is reflected back to space. One major class of Earth Observation instruments are termed optical because they obtain data by recording this reflected energy across various wavelengths, including visible light and invisible infrared bands.

The number of bands available to an optical instrument is called its spectral resolution, and a higher resolution allows more accurate characterisation of different materials.

Other sensors known as radar instruments actively shine microwaves pulses down to Earth in order to record how these pulses get reflected back up to space. These

instruments measure surface roughness instead of light or heat energy, and have the advantage of being able to see through cloud and darkness. And by combining together different radar images of the same location – a technique known as interferometry – tiny millimetre-scale ground motion can be identified.

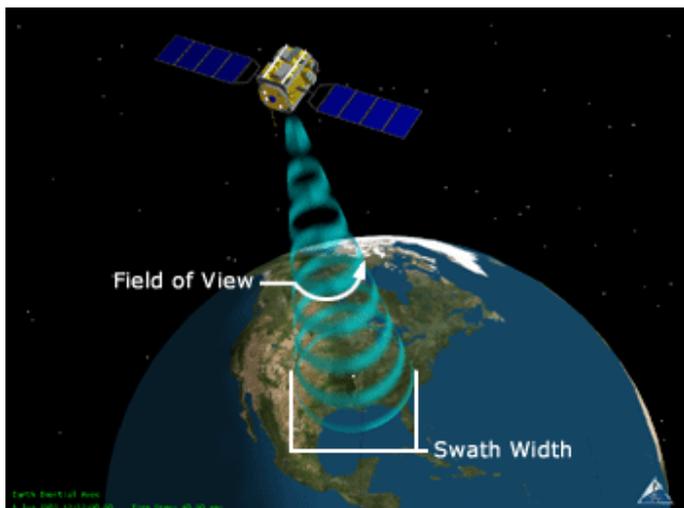
A different type of instrument named a altimeter records very precisely the time it takes for a microwave or laser pulse to be bounced back to the satellite, measuring both land and sea height to an accuracy of a few centimetres.

The make-up of the Earth's atmosphere is also the subject of Earth Observation monitoring. Atmospheric instruments work by detecting how the envelope of air surrounding our planet affects light, heat or radio energy passing through it. Certain 'signature' spectral wavelengths are either absorbed or emitted by the atmosphere indicate the presence of associated chemicals and gases.

Depending on their orbit and intended function, different Earth Observation satellite instruments have differing spatial resolutions, which means the minimum size of detail observable in an image.

Low spatial resolution instruments are best for the study of regional vegetation coverage or wide-area weather and cloud patterns. Intermediate resolution sensors are typically used for agriculture and resource mapping as well as assessing the impact of disasters, while the highest resolution sensors can show individual roads, buildings or even cars.

## How Satellites Observe the Earth



Most Earth orbiting satellites are in what's called low earth orbit. This means they generally orbit north to south, or south to north, whilst the earth turns below them, and they image a 'swath' of variable width below the spacecraft with their imaging instruments. The swath width can be 2.5 thousands km wide enabling some satellites to cover

the entire planet everyday with imagery. To get more spacial detail, the resolution can be increased, but this will narrow the swath width, and lengthen time between images.

Low orbiting satellites are usually placed in sun-synchronous orbit, which means they pass over the earth at the same local solar time each day, which allows easy comparison between images taken on different dates.

Geostationary satellites are placed in orbit at a much greater distance from the earth at 36km away. This is just far enough that it rotates at the same angular rotation rate as the earth itself.

It's called a geostationary satellite because compared to the earth, it appears to be stationary.

The disadvantage is you can't see the entire Earth with one satellite. So, several are place in a ring around the Earth in order to provide a global picture.

While satellite acquisitions are most often presented in the form of pictures, they are actually digital data. So the same raw data can be processed with computer software in many different ways to extract whatever information the particular end user requires.

The next article will explore the various types of satellite missions, and start to describe certain data collected, such as looking at the atmosphere and monitoring aerosols.

*Elaine Spear*

### Island Planetarium @Fort Victoria

*The Island's Telescope Professionals*

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**on 07771550893**

## VAS 40th Anniversary

VAS will celebrate it's 40th anniversary on November 12th 2016 at

**The Breeze Restaurant,  
Island Harbour  
Binfield, Newport  
PO30 2LA**

The Breeze has recently been refurbished and we have reserved a separate room for the function. On offer is the "Rally" Menu or a Carvery option:

### The Rally Menu

#### Starters

- Homemade wild mushroom & cream cheese filo tart
- Homemade lemon sole goujons served with lemon mayonnaise
- Homemade carrot & coriander soup served with a warm ciabatta
- Tempura battered pork strips served with a homemade sweet & sour sauce

#### Mains

- Oven roasted breast of lamb stuffed with a mint stuffing, served on dauphinoise potatoes, topped with red wine gravy served with fresh vegetables
- Homemade steak & ale pie served with new potatoes, fresh vegetables and gravy
- Roasted cauliflower & hazelnut carbonara served with garlic ciabatta slices
- Oven roasted salmon served on seasoned spinach topped with tartar cream, served with new potatoes

#### Desserts

- Homemade tiramisu
- Homemade lemon meringue pie served with cream
- Homemade vanilla yogurt ice with honeyed pink grapefruit
- Homemade chocolate brownie served with ice cream and warm chocolate sauce

- Includes Tea or Coffee and mints

**2 courses - £19.95 (starter & main)**

**3 courses - £24.95 (starter, main & dessert)**

### Carvery option

- Choose from roasted rib eye of beef, roasted turkey breast or roasted pork loin.
- All served with garlic & rosemary roasted potatoes, homemade Yorkshire pudding, fresh vegetables and homemade beef gravy.

**£9.95 with additional charge for starters and desserts available from a main menu.**

**In order to ensure everyone can be accommodated, and to help the organiser(s) payment is required with the members choice of dishes.**

**A booking form will be included in the next NZ**

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## For 90 years, lightbulbs were designed to burn out. Now that's coming to LED bulbs

In 1924, representatives of the world's leading lightbulb manufacturers formed Phoebus, a cartel that fixed the average life of an incandescent bulb at 1,000 hours, ensuring that people would have to regularly buy bulbs and keep the manufacturers in business.

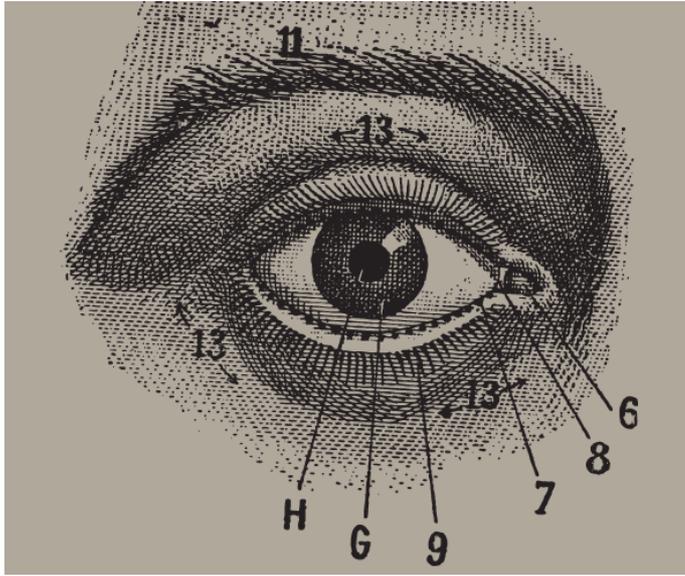
But hardware store LED bulbs have a typical duty-cycle of 25,000 hours -- meaning that the average American household will only have to buy new bulbs ever 42 years or so.

The lighting industry is panicked about "socket saturation," when all household bulbs have been replaced with long-lasting LED bulbs. There's signs that they're moving to limit the longevity of LED bulbs, albeit without the grossly illegal cartels of the Phoebus era. Philips is selling \$5 LED bulbs that have a 10,000 hour duty-cycle. Many no-name Chinese LED bulbs are so shoddy that they're sold by the kilo, and buyers are left to sort the totally defective (ranging from bulbs that don't work at all to bulbs that give people electrical shocks) from the marginally usable ones.

It's been less than a year since Philips pushed out a firmware update that gave its light fixtures the ability to detect and reject non-Philips lightbulbs -- and thanks to laws like the DMCA, it's a potential felony to alter your light fixture to override this behaviour and force it to work with non-Philips bulbs.

More at: <http://boingboing.net/>  
and: <http://www.newyorker.com/>

## Can the human eye detect a single photon? Surprisingly ... yes!



Just how dark does it have to be before our eyes stop working? Research by a team from Rockefeller University and the Research Institute of Molecular Pathology in Austria has shown that humans can detect the presence of a single photon, the smallest measurable unit of light. Previous studies had established that human subjects acclimated to the dark were capable only of reporting flashes of five to seven photons.

The work was led by [Alipasha Vaziri](#), associate professor and head of the Laboratory of Neurotechnology and Biophysics at Rockefeller and an adjunct investigator at the Research Institute of Molecular Pathology. It is published this week in Nature Communications.

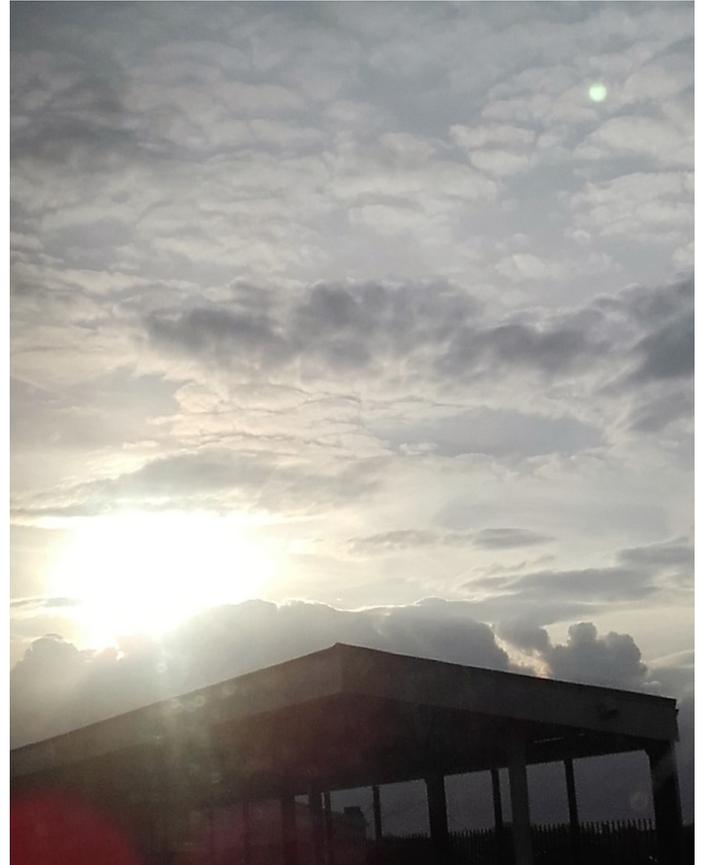
### Remarkable precision

“If you imagine this, it is remarkable: a photon, the smallest physical entity with quantum properties of which light consists, is interacting with a biological system consisting of billions of cells, all in a warm and wet environment,” says Vaziri. “The response that the photon generates survives all the way to the level of our awareness despite the ubiquitous background noise. Any man-made detector would need to be cooled and isolated from noise to behave the same way.”

In addition to recording the ability of the human eye to register a single photon, the researchers found that the probability of doing so was enhanced when a second photon was flashed a few seconds earlier, as if one photon “primes” the system to register the next.

More at: <https://scienceblog.com/>

## Morning Sun and Venus



I took this photo with my Samsung Core Prime mobile phone, at 9.25 am on Friday 8th April 2016 at Brading Station.

*Bryn Davis*

## Outreach Report

On the 5th July, 3 of us attended the Noel Turner Physics Festival at Cowes Enterprise College. Unfortunately our allocated space wasn't in the best location we did though have quite a lot of interest. Thanks to Graham Osborne and Bert Paice for their help.

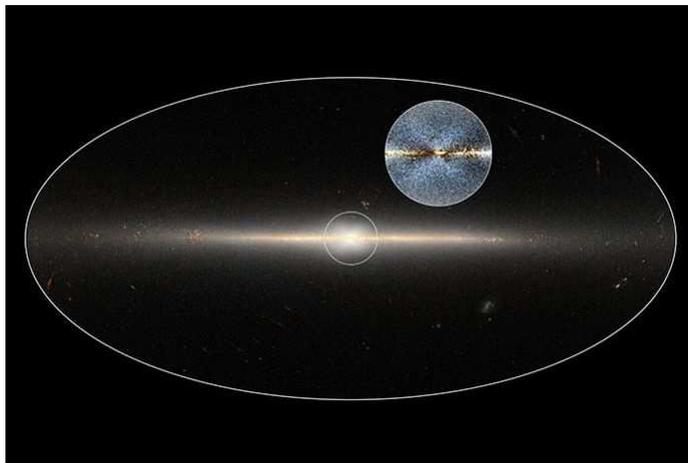
Simon Plumley and I took a couple of telescopes to the “Big Camp” National Trust event in Newtown on the 16th July. About 30 families were camping on site and among the natural science activities, our telescopes were intended to show the beautiful IW night skies at their best, unfortunately, yet again, the clouds spoiled the view.

Almost everyone looked though the telescopes, though all we could offer was a perfect view of the Rowridge radio and TV antenna”

*Maybe next time....*

*Brian Curd*

## X marks the spot at centre of the Milky Way galaxy, indicates NASA's WISE mission



An enormous X-shaped structure made of stars lies at the centre of the Milky Way, indicates a new study of infrared light coming from our home galaxy.

Many galaxies have an X-shaped structure at their core, but while previous studies have suggested the Milky Way contained such a structure, no-one had directly observed it.

The research, reported in *Astronomical Journal*, is the first evidence an X-shaped structure exists in our home galaxy.

The discovery started out serendipitously as a call out on social media.

In 2015, astronomer Dr Dustin Lang of Dunlap Institute of the University of Toronto posted data from NASA's Wide-field Infrared Survey Explorer (WISE) mission on Twitter.

Melissa Ness, a postdoctoral researcher at the Max Planck Institute for Astronomy in Heidelberg, Germany, recognised the X-shaped structure and contacted Dr Lang.

Together, they reanalysed the data.

“The WISE image of the Milky Way bulge shows that the X-shaped nature of the Milky Way bulge is self-evident and irrefutable,” they wrote in a paper published today in the *Astronomical Journal*.

“The X-shape morphology of the bulge in itself and the fraction of bulge stars that comprise orbits within this structure has important implications for the formation history of the Milky Way... and spiral galaxies in general.”

More at: <http://www.abc.net.au/>

## Where do deep space probes get their power?



As you are reading this, the Voyager 1 spacecraft, carrying its valuable gold-plated record describing life on Earth, is more than **20.1 billion kilometres away** – or 135 times the distance between the Earth and the sun. Its 46-year journey has taken it so far out into space that a conventional solar panel would not be enough to keep it online. It is, however, still sending back a faint signal, but how is this possible?

Most of the world's energy comes from burning fuels – heating materials such as coal, gas, oil – or even wood – to covert water to steam, which powers a turbine to produce electricity.

For a spacecraft this isn't so simple. It would be impossible to carry enough stored fuel to maintain power for any reasonable time over the vast distances of space travel.

Solar panels are a good alternative in many cases. Their only fuel source is the sun, which is not due to run out for billions of years.

Sounds perfect right?

Unfortunately, there's a flaw.

Solar panels need a direct line of sight to the sun to generate electricity. So a solar panel-equipped spacecraft behind a planet, a moon or in deep space where solar energy is miniscule will be powerless.

There is another option: it takes advantage of the heat generated by the decay of radioactive materials to provide power for decades using a fuel source the size of a golf ball.

Read more at: <https://cosmosmagazine.com/>

## VAS Officers and Committee Nominations 2016/17

For those wishing to stand for election at the AGM of the Society to be held on Friday 26th August 2016 at 7.00pm.

### Name and Address of Nominee:

### Standing for

- Chairman .....
- Treasurer.....
- Secretary .....
- Observatory Director.....
- Membership Secretary.....
- Programme Organiser.....
- Committee .....

Proposed by: .....

Seconded by: .....

Signature of Nominee:.....

### Notes

- The Committee meets once each month usually on a Thursday evening before the club night.
- No person can be elected to more than one position.
- Only adult fully paid-up members may stand for election (or propose or second).
- All completed nomination forms to be received by the Secretary at least 7 days before the AGM.
- The Committee consists of not less than six members.

## THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

### Pavilion Building Work

#### ***The Pavilion update is fully underway and the area is now a "building site"***

***Anyone visiting the observatory must use a torch to ensure their own safety***

***Paths to the observatory are fenced off and cannot be used***

***Be very careful when visiting the observatory in the dark!***

#### **National Trust Event 2016**

The National Trust are holding **A Night event at Mottistone Manor on 31st August**

***Please let me know if you can help***

### Ransomware

I'm sure all members are fully aware of the need to protect their computer equipment with suitable anti-virus software and to ensure that vital data is regularly backed-up. I have long been involved in recovering PCs from virus and malware attacks and, until recently, had a perfect record of removing infections with no loss of data. Unfortunately that record has been lost due to a particularly hostile "Ransomware" installation on a compromised Windows 7 PC.

The attack, which I believe came in when the owner clicked a link in an email to download what appeared to be a pdf file. Unfortunately it wasn't, instead it was a disguised .exe which then proceeded to encrypt every data file on the PC - photos, music, Word document etc, and then demand \$1000 for a file/key to decrypt them.

Payment could have been made but of course there was no warranty that a key would ever be sent. My customer decided not to pay and, as he had no back-up, to lose about 10 years of family photos, homework and letters - all the stuff you'd find on a family PC.

Ransomware is nasty and it is a real threat to all computer users. Please make sure you have a backup of your valuable files and make sure you test the validity of that backup from time to time.

For extra security, keep a separate archive copy of your files on a disk not normally connected to your machine.

#### ***Never open an email attachment if you don't know and trust where it came from***

### Observatory

When visiting the VAS observatory, for your own safety, 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 needs letters, articles, reviews or pictures related to astronomy. Contributions to the Editor at the email or postal address on the front page.

*"To become old and wise one has to have been young and stupid"*

***Anon***

*"Any idiot can face a crisis - it's day to day living that wears you out"*

***Anton Chekhov***

*"I think I've discovered the secret of life - you just hang around until you get used to it"*

***Charles M. Schulz***

*"Always remember that you are absolutely unique. Just like everyone else"*

***Margaret Mead***