

## Society News

Well here we are again, Winter! Yes, it starts officially on Sunday morning 30th October at 1am when BST stops and we return to GMT. I shall be a year older by then and probably feeling the cold a little more than this time last year. Joking aside, it really is very easy to get too cold when standing outside observing and you should be prepared. We forget how inactive our hobby is, feet in one place and certainly no running about.

### *A few guidelines:*

- Don't wear cotton next to your skin, and minimize it elsewhere as well. Cotton holds water, and when damp, the fabric loses its insulating value.
- Use layers of clothing. This builds in insulating boundaries and allows you to add or remove layers to regulate your temperature.
- Keep your head and feet warm. You lose a lot of heat from your head. You'll feel a lot warmer if your head is warm. Your feet get cold because the body will constrict blood flow to the extremities trying to keep your core warm.

### *Specifics:*

- **Head:** Get some close fitting headgear that has good insulation. Close fitting just so it won't flap around and get in your way.
- **Feet:** Remember. NO COTTON. Feet sweat a lot, and shoes tend to trap any moisture. So thin poly socks against your skin, then some wool or smart-wool heavy boot socks, and good insulating boots.
- **Underwear:** Polyester longjohns should be okay. Just stay away from fabrics that absorb water.
- **Outerwear:** Layers, no cotton, wind proof an outer layer. A nylon shell over a fleece should do well.
- **Gloves:** Mittens will keep your hands warmer than fingered ones. Find some that have a "flap" to expose your fingers so you can work or type.

*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

Castle Haven Cottage, Castle Haven Lane, Niton Undercliff, Isle of Wight, PO38 2ND

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

<b>Monday,</b> 19.30hrs	<b>Members Only.</b> Telescope and night sky training. <b>Contact Barry Bates 01983 872979</b>
<b>Thursday,</b> 19.30hrs	<b>Members and Public.</b> Informal meeting and observing.

## Contents this Month

<i>Society News</i> .....	1
<i>Monthly Meeting Calendar 2011</i> .....	2
<i>Monthly Meeting Calendar 2012</i> .....	2
<i>This Month's Sky Map</i> .....	3
<i>This Month's Night Sky</i> .....	4
<i>Book Review</i> .....	5
<i>The Garlic Festival 2011</i> .....	5
<i>Dark Energy Project</i> .....	6
<i>Discs, Stars &amp; Galaxies</i> .....	7
<i>Essays from a beginner</i> .....	9
<i>The Back Page</i> .....	10

## Monthly Meeting Calendar 2011

Check the website for up to the minute information.

<p>Travel for our monthly speakers is sponsored by:</p> 		
Date	Subject	Speaker
28 Oct	Glow Bows and Haloos	Richard Fleet
25 Nov	An introduction to visual observing and equipment	John Slinn

*All details correct at time of publication.*

## Monthly Meeting Calendar 2012

Date	Subject	Speaker
27 Jan	Europe's first mission to the moon	Barry Kellet
23 Mar	Black Holes	Prof. Ian Morrison
27 Apr	Answering the Biggest Questions with the Biggest Surveys	Dr Thomas Kitching

Elaine Spear has already managed to get 3 speakers booked for 2012 and is busily contacting others to fill the rest of the calendar.

April's meeting is particularly interesting as Dr Kitching is an "Islander" - see "Dark Energy Project" on page 6.

### ISLE OF WIGHT STAR PARTY

**22nd - 26th March 2012**

Come and Enjoy Some of the Darkest Skies in the South

<http://www.iowstarparty.org/> for more details

## New Members

A very warm welcome to VAS for our new members:

- Julia Maciw
- Veronica Hext
- Gavin Chadwick

## Thursday Meeting Notice

**Please Note: On Thursday 24th November we are entertaining a group of Sea Scouts at the Observatory from 19.00 to 20.30 hrs.**

**The observatory will be open for the normal Thursday observing session after 20.30.**

## StarGazing Live! 2012

Plans are underway for our next StarGazing Live! event. To coincide with the next BBC series (16th-18th Jan 2012) VAS will host an evening of StarGazing on Friday 20th Jan.

More details as we get nearer to that date but in the meantime, if you can help in any way, please contact any committee member.

## Telescope News

### 10" (250mm) Orion

The observatory 10" Orion has recently been fitted with a motorized focuser; this prevents vibration and any slight shifting of the telescope when refocusing. Funding for this was drawn from the latest generous gift from Edna Cahill

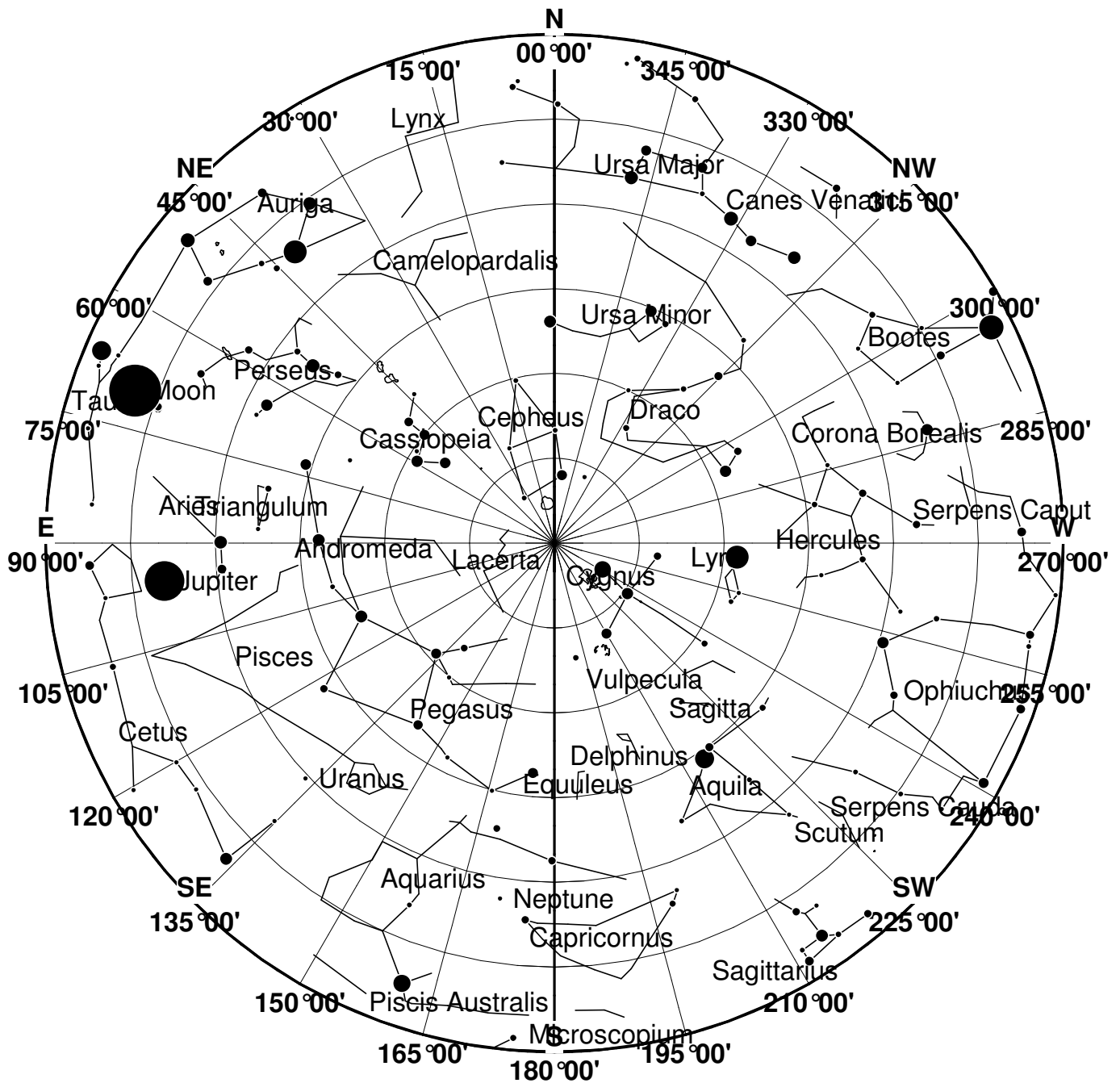
### 6" 150mm Reflector

Re-aluminized optics have been fitted and collimated making the telescope fully operational. This gives us another very useful, portable small telescope, particularly convenient for taking to outreach events.

*A detailed inventory of the Society's equipment is available - just ask any committee member for details.*

*Richard Flux*  
Curator of Instruments

# This Month's Sky Map



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



**The Triangulum Galaxy** is a spiral galaxy approximately 3 million light years from Earth in the constellation Triangulum. Catalogued as Messier 33 or NGC 598, and is sometimes known as the Pinwheel Galaxy, a nickname it shares with Messier 101. The Triangulum Galaxy is the third-largest member of the Local Group of galaxies, which includes the Milky Way, Andromeda and about 30 other smaller galaxies. It is one of the most distant permanent objects that can be viewed with the naked eye.

*This article is licensed under the [GNU Free Documentation License](https://www.gnu.org/licenses/fdl.html). It uses material from the Wikipedia article "Triangulum Galaxy"*

## This Month's Night Sky

### Moon Phases

New	1 <sup>st</sup> Qtr	Full	Last Qtr
25th	2nd	10th	18th

### Planets

#### Mercury

Mercury makes an appearance in the evening sky this month but from our location here in the northern hemisphere this apparition is not a good one. The orbital geometry is such that the planet sets at about the same time as the Sun. Head much further south for a good view.

#### Venus

Venus, like Mercury is also present in the evening sky, but the same problem with geometry causes it to languish in the glare of sunset. For the first fortnight Venus and Mercury are within 2 degrees of one another, after that Venus pulls away from the Sun but remains low on the Horizon. Its brightness means that given a good western outlook it should be visible, but it will not be an outstanding sight; that will have to wait for the new year.

#### Mars

Continuing its eastward march through the stars, this month Mars passes through Leo and close to Regulus its brightest star. Mars is now the brightest object in that region of the sky so with its distinctive ruddy colour should be readily picked out against the nearby stars.

#### Jupiter

The dazzlingly bright Jupiter is set against the rather dim stars of Pisces. It is now past opposition but is still very well placed for observation from mid evening until the early hours.

#### Saturn

Saturn is just past superior conjunction, and is still hidden in the glare of sunrise.

#### Uranus & Neptune

Both are past their best but are still reasonably well placed for viewing during the early to mid evening period.

## Deep Sky objects

### **NGC1499 California Nebula RA 4h 1m Dec 36° 21' mag 5.0**

This very large nebula can be found just to the north of Menkib, Xi Persei. Although it may have a magnitude of 5 this light is spread out over an area of some 2 x 1 degrees making the surface brightness very low. It can be seen in large aperture binoculars and rich field telescopes but when using a telescope the magnification must be kept to the minimum available to stand any chance of seeing it. A hydrogen beta nebula filter will help to increase the contrast of the nebula. This is a good target for long exposure photography.

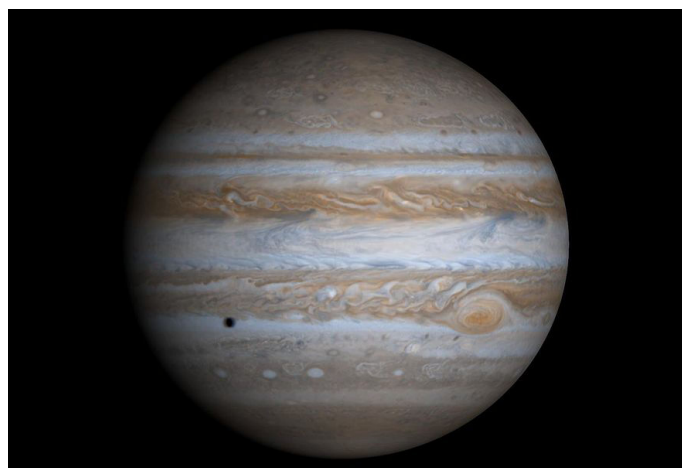
### **M103 Open Cluster RA 1h 34m Dec 60° 42' mag 7.0**

A celestial Christmas tree. This is a young cluster with many bright blue members, the brightest of which forms the star on top of the tree. It is a colourful cluster with a number of orange and yellow stars that make up the effect of Christmas tree lights. M103 is the last entry of Messier's catalogue, the remaining objects were added after his death based on his unpublished work.

### **M33 Galaxy RA 1h 34m Dec 45° 8' mag 7**

M33 in Triangulum is one of a number of galaxies that shares the common name Pin Wheel. It is another member of our local group of galaxies, but somewhat smaller than the Milky Way being only 1/7 its size. This galaxy despite its relatively bright apparent magnitude its large size, about that of the full moon makes it very difficult to see. It can be glimpsed in our skies with a pair of 10x50 binoculars as a slight brightening of the background sky. A telescope of at least 8 inches diameter is needed to see any structure in the spiral arms, and then it can be difficult. Don't be put off by the difficulties it is a worthwhile object for observation.

*Peter Burgess*





## Book Review

### The Sun Kings: the unexpected tragedy of Richard Carrington and the tale of how modern astronomy began

Stuart Clark 2007 Princeton University Press  
ISBN13: 978-0-691-12660-9



The recipe for *The Sun Kings* is a good one: take a little science, a handful of the history of astronomy, a good dollop of biography, and a pinch of historical background. Season with a few humorous or bizarre anecdotes, sprinkle in some illustrations, and mix to a smooth consistency with well-written English. Serve in a neat dish.

Richard Carrington, famous for observing one of the great solar flares of 1859, is the protagonist of the book, and Clark engages the reader with the triumphs and frustrations of his career and its appalling end, a tale so profoundly sad that it needs no synthetic pathos from the author. Other characters important in the history of astronomy and science appear too, and there is a brief look at current thinking about the sun and its mechanisms. Intentionally or otherwise, the main theme to emerge from the story is the huge impact on pure science of scientists' luck, obsession, prejudice, money, social status, love, spite, and mere pig-headedness.

As always, the most recent material becomes out-of-date most quickly, but not enough to detract from the interest of the book, while accounts of past solar storms and predictions of doom reminded me to re-read Larry Niven's *Inconstant Moon*. My favourite digressions are the ones about Elias Loomis determining the velocity required to disintegrate chickens, and the tale of the magnetised umbrella.

The book is only 190 pages, not counting the bibliography, and I'd definitely recommend it to enliven some cloudy evenings.

*Rebecca Mitchelmore*

## For Sale

### Orion Intelliscope 12inch

with 10mm and 25mm Plossl eyepieces and Red Dot finder. Also included is a removable four wheel trolley  
£500

Contact Tony Williams at  
[tonykwilliams@btinternet.com](mailto:tonykwilliams@btinternet.com) or 613428

## The Garlic Festival 2011

The Society had a very successful weekend at the event this year, as well as providing a very strong contingent of marshals – a niche the VAS seems to have established for itself – we exhibited for the first time in several years. We were invited to share a tent with Raynet (The Radio Amateurs' Emergency Network) so that both organisations could promote their activities to the public. The generously proportioned tent was kindly loaned by one of their members but erecting this structure proved to be an interesting adventure in itself. Although of an ingenious and substantial design it was, alas, totally devoid of instructions and took five of us three hours to assemble!

Our display generated considerable interest over the two days and we attracted 4 new members. A small telescope, obtained by Brian Curd was raffled and this made over £200. Our pitch, fortuitously, was sited adjacent to a generator with some spare capacity, enabling both groups to benefit from a power supply.

Also, close to our location was a 'Star Wars' enactment group which caused considerable interest and despite the fearsome reputation that Darth Vader and his white – suited storm troopers have around the galaxy they were kind enough to pose for photos and even draw the winning ticket for the telescope.

At the time of writing our reward is yet to be received but should exceed our previous record.

**Tremendous thanks must go to the members who gave up their time as marshals – Frank Alfrey, John & Pam Ash, Barry Bates, Brian Curd, George Beesley, Bryn Davies, Bill Johnston, John Langley, Dennis Norris, Norman & Linda Osbourne, Madeleine Paterson, Elaine Spear, Tony & Narleen Williams and Doug White.**

**The stand was valiantly staffed by – Sue Curd, Faith Jordan, Stephen Griffiths, Trevor Key and Burt Paice.**

**And above and beyond the call of duty non – members Pat Barber, Glynis, Felicity and Jennifer Bates, Albert Gillard and Ellie Johnston.**

Let us hope we can have an equally rewarding and fruitful event in 2012 – if you would care to keep August 18th and 19th free I will be unleashing the press gang in the spring!

Thank you again to all concerned.

*Richard Flux*

## The Astronomer

*He loves the dark unclouded skies  
Revealing works beyond our ken:  
Exotic shapes of wondrous form  
That tax the questing minds of men*  
**John Smith**

## A good time had by all

A group of about 14 pharmacy staff thoroughly enjoyed a slide presentation given by Faith. This was followed by Barry showing them around the dome. Everyone enjoyed the visit, unfortunately the clouds had gathered earlier so could not do any star gazing.

Glynn very kindly popped down and had brought some of his superb photos which he showed on the monitor downstairs.

Julie and Thomas are extremely grateful to Faith for the excellent presentation (who kindly stepped in at last minute), Barry for showing the group the main telescope and Glynn for coming down with his photos. Not forgetting Brian who arranged for Faith to give the presentation and setting it up.

I (Julie) have had lots of positive feedback from the group. Some have already been out with their binoculars looking at the stars. One couple even travelled to Culver Down with flask and coats and sat on the cliff looking at the stars with their binoculars on the next clear night.

*So a huge THANK YOU from Julie and Thomas.*

## Dark Energy Project

I just have to share this, today Tom Kitching (and his team of other Cosmologists) has had his proposal to the European space agency accepted

<http://www.bbc.co.uk/news/science-environment-15146082>

and

<http://www.ph.ed.ac.uk/news/dark-matter-mission-joins-european-space-agencys-cosmic-vision-11-10-11>

The Dark Energy Project has been a substantial element of his work for the last few years it is brilliant news for an Isle of Wight

*Dave Kitching*

*Note: Dr Thomas Kitching will be our monthly meeting speaker on 27 Apr 2012.*

## For Sale

### Meade Schmidt-Cassegrain Telescope 102mm (4 inch) f/10

(no mount - fits on photo tripod) with 2 inch diagonal. Has some scratches on the tube and on tripod attachment and is a bit tatty but optically fine. Suited to viewing bright DSOs, the Moon and planets and a good scope for travelling or as a terrestrial spotting scope.

£60

### 40mm Televue Plossl eyepiece

1.25" barrel. In good condition apart from some dust and a few cosmetic scratches on the barrel where it goes into the focuser. £50

### 5mm Vixen Lanthanum eyepiece

1.25" barrel. In fair condition (the rubber armour on the body has faded a bit and looks blotchy) but optically fine. Boxed. £40

**Contact Faith at**

***chairman@wightastronomy.org***  
***or phone 07867 747780***



*Gaia's 1 Billion Pixel CCD - see page 10*

## Island Planetarium @ Fort Victoria

*The Island's Telescope Professionals*

New Celestron & Meade Scopes and Accessories.  
Other makes also available, just ask!

At least 10% discount on SRP for VAS Members

In stock demo and used scopes,  
Celestron GOTO Starters and up to 8" SCTs

Call 761555, leave number if not there,  
and we'll call you back.

***enquiry@islandastronomy.co.uk***

## Discs, Stars & Galaxies

**James Fradgley (Wessex AS)**

### Lecture report 23 September 2011

Here's a lecture alerting philosophers of science to a hands-on experience of basic questions - for example, on the one hand, mechanics, physics and mathematics suggest better and better models to explain astrophysical phenomena, but on the other hand why do we suppose they can be adequately described by scientific laws? A bonfire cannot be understood by mathematics, yet the physics and chemistry of combustion combined with words probably tells us all there is to know about them. But out there, viewed from the hopefully safe distances spanned by telescopes, are enormously bigger, more violent and stranger phenomena. To what extent can they be 'understood' by the rules of science? Here's a field where we see the phenomenon of 'description inversion' - the models are presented first, followed by how they explain the data, whereas the data often comes first, followed by developing the models. In this well-illustrated hour's talk, we journeyed around the theories, peered at images stretching our imaginations, saw how radio and infrared gives data from deeper within the dust, found that amateurs have helped to collect optical information, and contemplated accretion discs around the cosmocraters of black holes.

### Why do we get discs?

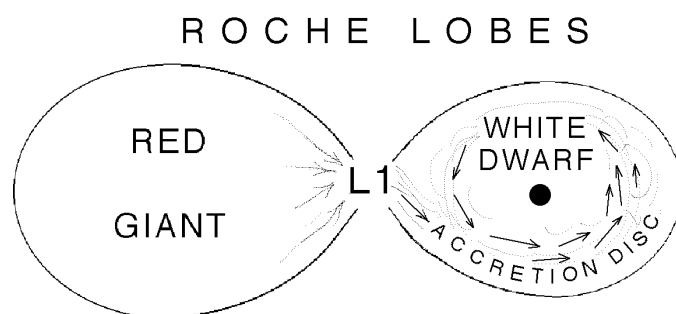
The picture starts with a huge uniform cloud of dust. In it, gravitation pulls the dust into regions of higher concentration, each with a centre of mass. Two such regions attract each other along their connecting line, but another region can pull them off-line, so when they meet and coalesce, they rotate like a pair of ice-skaters coming from opposite directions locking together into a spin. As the region contracts, dust sticks to itself, eventually forming dense objects. During contraction, spinning increases, but in the absence of external forces they can only rotate around one axis. Centrifugal effects do the rest, so it is common to find galaxies as flattened spirals, and to see within, stars surrounded by 'debris discs', where planets form, where life gets going, and someone called Edouard Roche (1820-1883), a professor at Montpellier University, studied Laplace's theories on nebulae, doing calculations on the stability of orbiting moons.

Newton's inverse square law of gravitation says that a sphere behaves as if its mass is concentrated at the centre, giving circular or elliptical orbits for two such bodies. However the Moon is not a point, but a ball of dust and rocks held together by self-gravity and all these bits and

pieces are somehow expected to follow the orbit of the centre of mass of the Moon. The Moon being locked to face the Earth, all its rocks have the same orbital period around the Earth. Lunar rocks closer to the Earth than the Moon's centre, experience less centripetal orbital acceleration, so the Earth gets a stronger grip on the nearer ones, called a 'tidal force', giving the Lagrangian point L1 when the rocks would just start to lift from the lunar surface if the Moon were large enough or came close enough to Earth. Then the bits would come flying off, raining down on Earth, whilst the further parts of the Moon travelling rather fast, would disperse, forming a disc, like Saturn's rings.

With the Moon getting all this attention, curiously it is called 'the secondary body', while the body around which the disc forms is called 'the primary body' and for this to happen, various limits have to be exceeded. The secondary body can become distorted into an egg shape, whilst the primary body can become more oblate.

### Variable discs in binary systems



Sketch 1

In Sketch 1, an expanding red giant is the secondary object, welling up within the teardrop-shaped 'Roche lobe', spuming material through L1 to the primary, a white dwarf. This gives the now oft-seen diagram looking like a pancake sucking on a bugle attached to a balloon. But with additional effects coming from magnetic fields, ionization, heating at collisions making hot spots, eclipses, and with stars following three routes on the H-R diagram of luminosity versus colour, giving various methods of overflow, a wide variety of phenomena occur. Objects illustrated and discussed included:

**T Tauri stars:** found near molecular clouds, powered by gravitational collapse, half of them have discs making X-rays and radio noise. Powerful stellar winds transfer angular momentum to the disc, containing clumps and exhibiting variability. Young stellar objects **YSOs** are formed before becoming main sequence stars, perhaps our Sun started out as one of these.

**Beta Pictoris:** this star emits an excess of infrared, signalling the presence of dust. Its disc was the first to be imaged and is a major source of the 20-micron interstellar

meteoroids which come whistling through our solar system. Beta Pictoris probably formed from the same dust cloud as others in this group. 2000 K hotter than our Sun, it is whiter and 9 times brighter but is less than twice the solar mass and has a higher ratio of heavy elements. With only half the surface gravity, it spins in 16 hours and has an additional inclined dust disc, possibly containing a massive planet, carbon-rich planets may also be forming.

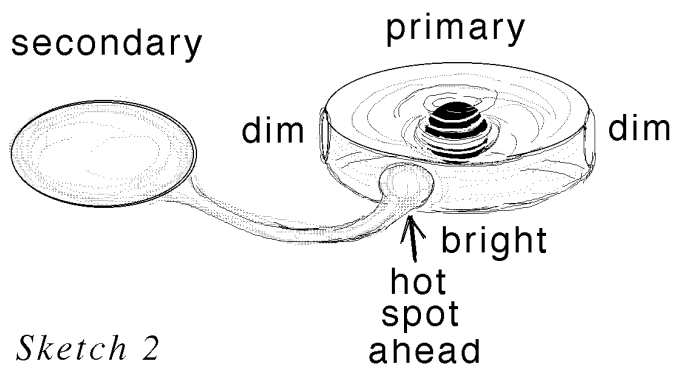
**NGC 5746:** a massive ‘double fried egg’ spiral galaxy, the optical disc is seen edge-on, it has a halo of hot gas.

**OY Carinae:** 277 light years away, an eclipsing white variable dwarf and red dwarf orbit each other every 1.51 hours, another companion may explain orbital variations.

**Nova RS Oph 2006:** an artist’s impression resembling a tropical flower was seen.

**Omega Centauri NGC 5139:** scientifically, when considering the formation of discs, it is useful to consider this rotating system, a spherically distributed globular cluster containing neutral gases, but no disc, possibly due to a lack of dust. It is a mystery.

**Propeller System AE Aq r:** A film clip showed matter spraying from the secondary companion star, like a fireman’s hose, towards a white dwarf, but with such a large magnetic field it acts like a propeller, flinging material out of the system. Amateurs have participated in getting thousands of measurements of the light, varying periodically over hours, for correlation with X-ray data. Also called an ‘**intermediate polar**’ system. In Sketch 2, streams of matter swirl along magnetic field lines, towards the white dwarf, making a lenticular hot spot ahead of the secondary. This hot spot is brightest when viewed in the central region, and goes dim at the edges when viewed edge-on, getting pushed against magnetic curtains, deduced from looking at the shapes of light-curves as the system shifts through its phases.



**Eta Carinae:** about 8000 light-years from the Sun, so luminous it couldn’t hold onto its outer layer, exceeding the Eddington limit when radiation pressure exceeds gravitation. It contains a Luminous Blue Variable **LBV**, but an enormous red nebula obscures our optical view. It

makes more than a million times the light of the Sun, but is only about a hundred times more massive and is expected to explode in the near future. Only a few dozen systems in the Milky Way approach or exceed the Eddington limit. Its internal structure has not fully recovered since a huge outburst of light in 1843. The reason for outbursts is not known, it gave a sudden unexpected doubling in brightness in 1998-1997. It may explode as a hypernova.

With all this illustrative material we moved to other mechanisms of overflow, with the Roche lobe shrinking by loss of angular momentum and magnetic braking, with stars moving close together, and full tidal locking like Pluto and Charon, this sometimes prevents the formation of discs. When the objects rotate with a period of a few hours, gravitational radiation can send energy away, doughnuts can form, collisions within the discs at 6000 km/sec can occur making 10nm ultraviolet light which gets absorbed in the interstellar medium.

Cyclic variability of **Dwarf Novae**, powered by gravitational collapse, was described with more diagrams. As the gas streams into the disc, making it hot and ionized, the temperature can increase the viscosity, altering the transmission of shear and matter between spinning regions of the disc, giving variable output, producing a luminosity related to period, so they might be useful as distance indicators.

## Active Galactic Nuclei

Astrophysics knows no limits - multiply masses by several factors of ten and a binary system can consist of a black hole dismembering a neutron star, making axial jets. What happens in the middles of galaxies with ‘active galactic nuclei’, like **OJ287** in Cancer, where a small black hole periodically moves through the accretion disc, was the third part of this lecture, including **TOADs**, Tremendous Output Amplitude Dwarf novae. But it was noted that stars usually do things slightly differently from what it says in the books, “nothing is ever as simple as what is said.” The discussion delved into paradoxes and deeper unknowns such as why doesn’t dark matter form discs?

For a very advanced discussion of model development, return to Roche’s home country and see “The disc instability model of dwarf-novae and low-mass X-ray binary transients”, Jean-Pierre Lasota, Institut d’Astrophysique de Paris, arXiv:astro-ph/0102072, 2001.

**Beware when applying for a job in astronomical circles if you hear them talking about CVs. These letters now commonly stand for ‘Cataclysmic Variables’.**

*Dr. Guy Moore*



## Essays from a beginner: *On writing things down*

If I keep an observing log, will it add to the sum of human knowledge? Frankly, no.

You know all those keen astronomers saying you should always log your observations? It sounds ridiculous to a beginner. Here I am, just been on the interthing reading about the latest cosmological investigations, and now I'm standing about in the dark with a pair of binoculars and illimitable ignorance. Log what, for goodness sake?

Almost by accident, I did make notes when I began stargazing. Early entries run like this: "13th February: Stargazing with binoculars - poor weather. 8th March: Trying to see Moon through old telescope (rubbish). 18th April: Looking for Hercules." There came a day when I made this entry: "3rd May: Bought telescope. First light - the Moon." After this I boldly went in for multiple sentences, and then gradually notes about weather and seeing conditions, equipment used and any problems with it, and more detail of what I actually saw.

I'm glad I did. It's only two and a half years but I had forgotten, for example, about that beastly thing pretending to be a telescope, which someone gave my son, and which was in fact a device carefully calibrated by the foul fiend Ignorance to destroy his and my pleasure in the sky. Other sessions are far from forgotten: The Night of the First Shadow Transit on Jupiter; The Night When I Finally Found the Comet; The Night of the Mystery Object; The Night of the Monster Iridium Flare; The Night of the Perfect Seeing When it Would Be a Sin to Go to Bed. There are earthbound labels too: The Night of the Thing in the Garden; The Night of the Inebriated Brummies Who Didn't Know I was There; The Night I Dropped Everything into the Roses; The Night of the SPIDERS (and it's a wonder I kept going after that one). It amuses me to recognise these through their prosaic log entries.

Keeping the log helps my memory in other ways, the writing process itself fixing information about methods or objects in longer term storage. I don't recall details well when I am under-slept (highly probable in the circumstances), and, if there is a long interval between one session and the next, I'm quite likely to lose the learning I painfully stuffed into my brain. Scribbling notes in the dark and going over them in the morning to make a fair copy, looking over charts to check an identification, realising what I missed seeing and planning to go back for it, are part of my training, for hobbyists usually have to be autodidacts.

So revisiting the question: Does my observing log add anything to the sum of human knowledge? Yes, it does: it adds it to mine.

*Rebecca Mitchelmore*

## Alma



One of the 21st Century's grand scientific undertakings has begun its quest to view the "Cosmic Dawn".

The Atacama large millimetre/submillimetre array (Alma) in Chile is the largest, most complex telescope ever built.

Alma's purpose is to study processes occurring a few hundred million years after the formation of the Universe when the first stars began to shine.

Its work should help explain why the cosmos looks the way it does today.

One of Alma's scientific operations astronomers, Dr Diego Garcia, said that the effective switching on of the giant telescope ushered in a "new golden age of astronomy".

"We are going to be able to see the beginning of the Universe, how the first galaxies were formed. We are going to learn so much more about how the Universe works," he told BBC News.

Alma consists of an array of linked giant antennas on top of the highest plateau in the Atacama desert, close to Chile's border with Bolivia.

It has been under construction since 2003. With the addition of new antennas, the telescope has been able to see progressively deeper into the cosmos and discern star formation processes in ever greater detail.

The full testing and commissioning of its 20th antenna has enabled Alma to record events that have never been seen before. It is now that the first scientific discoveries can be made.

As a taster of what is to come, the European Southern Observatory, one of the organisations that run the facility, has released the first images taken by Alma. They show - perhaps appropriately for the occasion - the collision of two galaxies known as the Antennae Galaxies.

More at: <http://goo.gl/mLqWl>

## THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

### Niton Gets a Pier!



Not sure if it's caption competition material, but it looks like it's asking for it! Ryan assures me he's kneeling down, but I'm not so sure ;-)

Stephen Griffiths

### A billion pixels for a billion stars

I doubt those going to the Homebase DIY store in Chelmsford to buy a pot of paint give much thought to what goes on in the hi-tech factory building next door.

This is the HQ of e2v, a company that made its name producing valves for the post-war television industry but which now produces camera sensors for some of the biggest space missions flying today.

The latest pictures of Mars and Mercury, close-up movies of the Sun, and the extraordinary cosmic vistas from Hubble - all are acquired thanks to the charge-coupled devices (CCDs) manufactured at e2v in the East of England.

Simply put, CCDs turn the light falling on their surface into an electronic signal. For a camera system in, say, Hubble, which orbits some 560km above the Earth, that electronic signal is processed and transmitted to the ground where it can then be easily translated back into an image on a computer screen.

But whereas Hubble's premier instrument, the Wide Field Camera 3, incorporates just two e2v CCDs side by side, the sensor system the company has just completed includes 106 CCDs.

This huge (nearly one billion pixels) array will be fitted to the European Space Agency's Gaia satellite, due for launch in June 2013.

Gaia will be sent to an observing location 1.5 million km from Earth, from where it will slowly spin and scan the sky.

Over a five-year period, the satellite's e2v array, allied to two telescopes and some sophisticated instrumentation that includes an atomic clock, will make an unprecedented 3D map of our Milky Way Galaxy.

More at: <http://www.bbc.co.uk/news/science-environment-15242383>

### 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.

*“You see, wire telegraph is a kind of a very, very long cat. You pull his tail in New York and his head is meowing in Los Angeles. Do you understand this? And radio operates exactly the same way: you send signals here, they receive them there. The only difference is that there is no cat.”*

**Albert Einstein**

### Quotations

*“Reality is merely an illusion, albeit a very persistent one.”*

*“If A is success in life, then A equals x plus y plus z. Work is x; y is play; and z is keeping your mouth shut.”*

*“If the facts don't fit the theory, change the facts.”*

**Albert Einstein**