



Society News

From the Chairman

Since ancient times, September's full moon has been called the Harvest moon or Barley moon. As the full moon rises soon after sunset, farmers could continue to gather their harvest by the moonlight. Unfortunately for astronomers, this also means that any observing is rather limited during this time (which will be on the 15th this month).

However, while our moon restricts our seeing, another moon has been observed in detail. The Cassini spacecraft has recently imaged Enceladus, one of Saturn's moons. Enceladus is only about 500 km (310 miles) in diameter and Cassini passed within 50 km (30 miles) from its surface, travelling at about 17.7 km/s (40,000 miles per hour) relative to it. The data from Cassini was picked up by the Deep Space Network station in Canberra, Australia. Two more Enceladus flybys are planned for October. If you have internet access, more details are available at <http://www.nasa.gov/cassini>.

On the 22nd September, the Sun will cross the celestial equator, moving from the north to the south, known as the Autumnal Equinox. It is also known as the First Point of Libra. The date of the equinox varies slightly from year to year, as the Earth does not orbit the Sun in a nice round number of days, but nearer to 365.25 days. At the North

Pole, the Sun sinks below the horizon on the Autumnal Equinox, and does not rise again until the Spring Equinox, six months later. The polar bears must get to see some wonderful starry skies. Hopefully, here on the Isle of Wight, we too can settle in to some longer nights of observing.

Clear Skies!
Dr Lucy Rogers
Chairman, Vectis Astronomical Society

Dates for your Diary

Observatory 10th Anniversary. We have booked the pavilion for the afternoon of Sunday 28th September. Numbers will be limited for the event, if you would like to attend, please contact **Roger Hayward**.

HAG Visit. We are hoping to arrange a visit to the Hampshire Astronomical Group. If you are interested please contact **Richard Flux**.

Isle of Wight Star Party. Thurs 26th March to Mon 30th March 2009. Expressions of interest to **Stephen Griffiths** (info@iowstarparty.org). More details in NZ soon, or visit www.iowstarparty.org

International Year of Astronomy. Throughout 2009, VAS will be involved in promoting astronomy to the general public. *See page 2 for more details.*

VAS Website: www.vectis-astro.org.uk

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

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Tel: 01983 864303 or email: brian@briancurd.com

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

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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

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VAS 2008 - Meeting Programme*

Sep 26th	The Tunguska Event - David Smith FInst, FRAS
Oct 24th	Beyond the Eyepiece - Peter Burgess
Nov 28th	Historic Telescopes of Cambridge University - Mark Hurn
* Correct at time of publication	

New Members

VAS welcomes two new members this month:

- Mr I. Merrifield
- Mr C. Westlotorn

Tony Plucknett

Astronomy Course**“OUR UNDERSTANDING OF THE UNIVERSE”**

Tutor: Ian Morison

Friday 12 - Sunday 14 December 2008

A chance to find out more about some of the most interesting aspects of modern astronomy. The opening lecture 'Beauty in the Heavens' Will focus on the beautiful sights of the Aurora Borealis and eclipses of the Sun and Moon. 'The Search for Other Worlds' will discuss the hot topic of detecting other solar systems, 'Our Island Universe', is a look at how galaxies are formed, 'Ageing Stars', the latter days in the lives of stars as they form White Dwarfs, Neutron stars and Black Holes. 'The Invisible Universe', is a consideration of the Dark Matter whose presence we can only detect by its gravitational influence. Add to this a lecture on '50 years of the Lovell Telescope' and a special behind the scenes visit to Jodrell Bank Observatory and some observation should the evening be clear and your insight into the world of astronomy is almost complete

Cost is £179 (£142 non-residential) - information from:

Burton Manor College
The Village
Burton
Neston
Cheshire
CH64 5SJ
0151 3355172
enquiry@burtonmanor.com
www.burtonmanor.com

Last month's riddle answer?

Sorry, I've been unable to get an answer from Stephen Taylor - hopefully all will be revealed next issue!

International Year of Astronomy 2009

From the official website:

“The vision of the International Year of Astronomy 2009 is to help the citizens of the world rediscover their place in the Universe through the day- and night time sky, and thereby engage a personal sense of wonder and discovery. All humans should realize the impact of astronomy and basic sciences on our daily lives, and understand better how scientific knowledge can contribute to a more equitable and peaceful society.”

VAS are planning events throughout 2009 and welcome any suggestions for suitable locations and partnerships with other interested clubs and organisations.

We hope to set up a working group tasked with promoting astronomy during 2009 and would appreciate the help of members during the year. If you think you can help with this project in any way, please contact either

Brian Curd - brian@briancurd.com or

Bill Johnston - bill.johnston@onwight.net

For more details of events throughout the UK, full information and other links please visit the IYA UK Website at

<http://www.astronomy2009.co.uk/>

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This Month's Night Sky

Moon Phases

New	1st Qtr	Full	Last Qtr
29th	7th	15th	22nd

The Sun crosses the celestial equator at 17h on the 22nd and marks the autumn equinox. Day and night are of equal length anywhere in the world on this date.

Planets

Although **MERCURY** reaches a maximum elongation from the Sun of 27° on the 11th the evening apparition is not a favourable one for observers in the northern hemisphere. Soon Mercury will be visible in the morning sky but at the moment it is too close to the Sun to be observable.

By now **VENUS** should start to become visible in the evening sky. This apparition will not be at its best until next year but the sheer brightness of the planet means that it will soon be a beacon in the western sky some 45 minutes after sunset.

On the 13th at 03h Venus and Mars lie $18'$ away from each other but when this occurs both planets will lie very close to the horizon at the time of civil twilight and with Mars being so faint the conjunction will not be favourable.

MARS is an unfavourable object as mentioned above.

Mid-month **JUPITER** transits at around 20:30 - around an hour after sunset and is therefore still a very favourable object for observation. Its normal west to east motion against the background stars of Sagittarius has now resumed and Jupiter is joined by the gibbous Moon on the 9th when at 22h the two bodies lie 3.5° apart.

SATURN is at solar conjunction on the 4th and is therefore unobservable.

URANUS is opposition on the 13th in the constellation of Aquarius. Use the all sky map to identify the region and with the aid of this month's finder map and a pair of binoculars, under a dark sky Uranus ought to be easily picked up. There are no bright stars in the region to point the way, the finder map shows stars down to magnitude 7, a little dimmer than Uranus over an area approximately twice that seen through a pair of 10x50 binoculars. The map shows Uranus moving steadily from east to west over the next two months and almost coming to a halt in November.

NEPTUNE, having reached its own opposition date last month is still worth the effort of searching even though its brightness is dimming slightly. See last month's finder map to aid in location

Meteors

The **Piscids** have a double maximum this month; on the 9th and 21st. Both dates are equally fairly favourable with a 9 day old Moon on the 9th setting just after midnight and a 21 day old Moon on the 21st not rising until 21:47. Expect rates of around 5 per hour on both dates.

The **alpha Aurigids** reach their second maximum of the year on the 15th and is unfavourable this year with the Full Moon above the horizon all night.

Occultations

20th Sept - 02:50-04:10 - Occultations of several stars in the Pleiades cluster in Taurus.

Deep Sky

M72 Globular Cluster R.A. 20h 54m Dec $-12^\circ 31'$ mag 10.0

Visually a rather small globular but it can be forgiven its apparent size when you consider that it is on the other side of the galaxy from us. It can be just seen in binoculars and a small to medium sized telescope with some magnification is needed to resolve any of the stars. It is not as tightly packed in the core as many globulars.

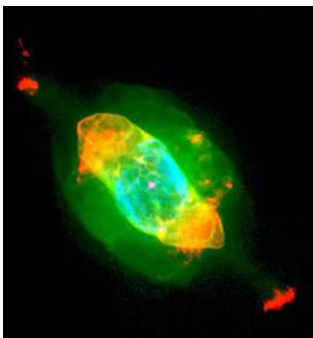
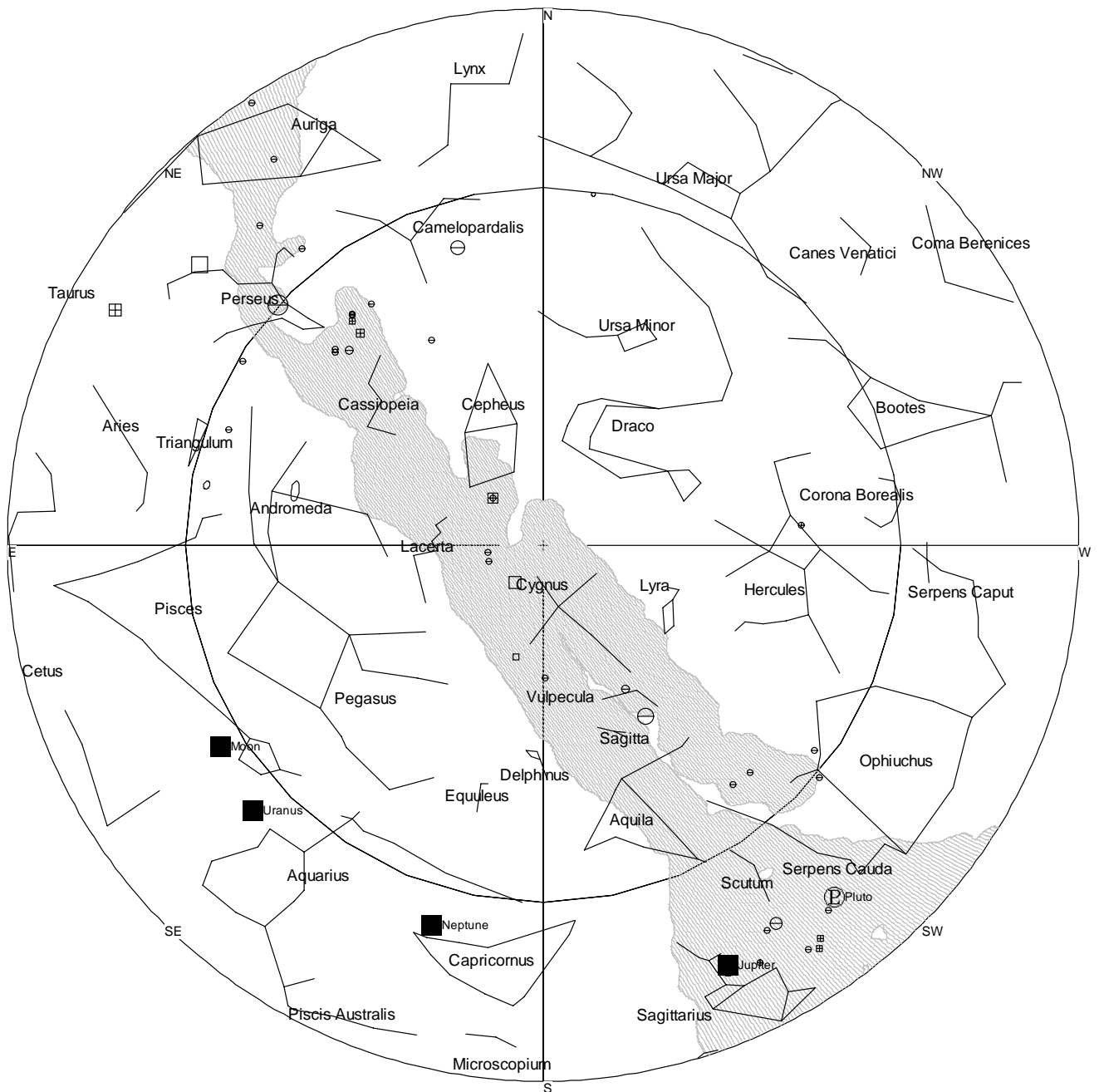
M73 Star Cluster R.A. 20h 59m Dec $-12^\circ 36'$ mag 9.0
This is a grouping of just four stars that form a Y pattern or perhaps a lambda depending on which way up it appears. The stars can be resolved in the smallest of telescopes used today and shows no sign of nebulosity. This is perhaps another pointer to the quality of some optical instruments being used in Messier's time that he mistook this object for something that looked like a comet. It is not known if this is just a chance alignment of stars or whether they form a true cluster.

NGC7009 The Saturn Nebula R.A. 21h 5m Dec $-11^\circ 20'$ mag 8.3

Originally discovered by William Herschel in 1782 and named by Lord Rosse who saw its elongated shape for the first time. This tiny nebula is one of the few that can show some hint of colour, usually reported as light green. The high brightness allows the use of fairly high magnification and being so small this is needed if the Saturn shape is to be seen.

Peter Burgess

September's Sky



Saturn Nebula - From Wikipedia, the free encyclopedia and Hubble Space Telescope
 The Saturn Nebula (also known as NGC 7009) is a planetary nebula in the Aquarius constellation. It was discovered by William Herschel on September 7, 1782 using his 20ft (focal length) reflector (telescope) at Slough England and one of his earliest discoveries in his sky survey. The nebula was originally a low-mass star that transformed into a rather bright white dwarf star, magnitude 11.5. The Saturn Nebula gets its name from its superficial resemblance to the planet Saturn with its rings nearly edge on to the observer. It was so named by Lord Rosse in the 1840s, when telescopes had improved to the point that its Saturn like shape could be discerned. William Henry Smyth said that the Saturn Nebula is one of Struve's 9 "Rare Celestial Objects."
 The distance to the Saturn nebula is not known very well because there are no reference stars in its neighbourhood that have been detected and could be used to accurately gauge its distance. Therefore, any distance is somewhat suspect. Hynes estimates it to be 2,400 light-years distance from earth. In 1963, O'Dell estimated the distance to be 3,900 light-years. The object is on many 'best of' observing lists, including: SAC 110 best NGC object list, RASC's Finest N.G.C. Objects, and The Caldwell Catalogue #55

String Theory

Dear Brian,

When I was about ten years of age I acquired an old star atlas and this publication led me on to one of the main hobbies in my life: astronomy. The books by Sir James Jeans and later by Professor Fred Hoyle captivated my imagination. In latter years I have become very interested in cosmology as this follows on quite naturally from pure astronomy.

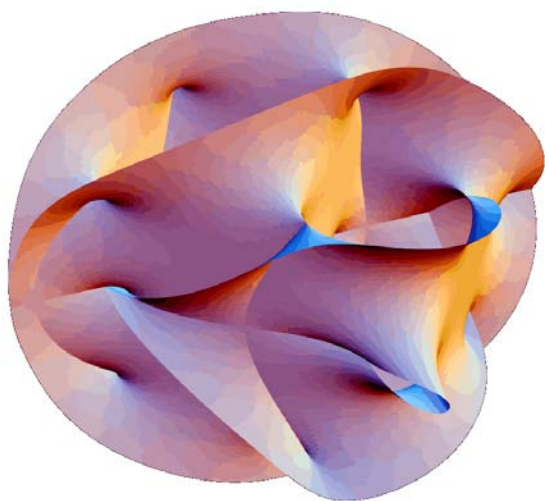
Very shortly the Large Hadron Collider will be brought into use and its findings will no doubt cause considerable interest in scientific and astronomical circles.

The Haldon Collider is well described in Astronomy Now (July 2008). Also a couple of books I have read give a lot of details on String Theory. (one "The Fabric of the Cosmos" by Brian Green: printed by Penguin Books, ISBN 978-0-141-03529-1, and the other being "Our Superstring Universe" by L.E.Lewis Jr: ISBN 0-595-27589-3) The book by L.E.Lewis is priced at £13.99 but may cost less than this from Amazon Books. L.E. Lewis is a physics teacher and his book is written in non mathematical language and intended as an introduction to the subject of string theory. This book should appeal to many members of our astronomical society.

As writing verse is another of my hobbies I thought that the readers of the New Zenith might like the lines I have written on the subject.

Yours sincerely
John Smith

String theory - Web Links



<http://www.superstringtheory.com/>
http://en.wikipedia.org/wiki/String_theory
<http://www.nuclecu.unam.mx/~alberto/physics/string.html>
<http://www.sukidog.com/jpierre/strings/>

Cosmic Strings

*Beyond our realm of space and time
Where only nothingness is known,
What caused our universe to be,
Did cosmic strings create our home?*

*Perhaps Higgs Boson forms exist
As particles or waves unseen,
All following nature's natural laws
Add mystery to this strangest scene.*

*We human beings have evolved
Twixt macro and the micro fields
In three dimensions that we know
But others too may be revealed.*

*So physicists with questing minds
Search eagerly for proof each day
And with equations hope to find
A theory matching every way.*

*With larger instruments they seek
To prove string theory holds the key,
To satisfy their brilliant minds
And normal folk like you and me.*

*These atom smashing tools may show
That super strings and branes are true,
And yet I feel the answers will
Pose many questions that are new.*

*Their theories hope to unify
The harmony in nature's laws:
This still eludes our human race
And we may never know the cause*

*What made our universe to be?
Did random strings and branes collide:
Create the start of the BIG BANG
To what we see on every side?*

*From nothingness we may have come,
To nothingness perhaps we go,
A sea of all vibrating strings
Obeying laws we may not know!*

John Smith MBE

The Cydonia Riddle (*Part 2 of 3*)

Not far west of the “Face on Mars” in Cydonia is another enigmatic landform of interest, which has been christened “The Fort”, it is captured in a couple of NASA’s Mars Odyssey probe’s visible-wavelength image-strips containing the Face. In animated synthetic perspective imagery from previous high-resolution photography (although, unfortunately not in two-dimensional images) it’s obvious that the Fort has collapsed inward - revealing a sunken interior consistent with a structural implosion (a collapse of the sort thought to have deformed the eastern “chin” of the Face). Its lowest point is roughly in the centre of the formation, leaving a skirt of jagged debris emerging from the fringe. Ascribing this most unusual effect to erosion violates basic geological principles - surface features don’t erode from the inside out, rather they are sculpted from the outside in!



The Fort suggests a collapsed geometric, possibly pyramidal, structure - the catalyst for the dramatic subsidence is probably to be found in the fresh impact craters that straddle it. Also of interest, upon enlargement, is a conspicuous tube or road-like feature radiating from the Fort’s eastern flank and appears to rest in a shallow depression that, if extended in a straight line would intersect the Face itself. Remnants of an infrastructure of some sort or just a fortuitous crack in the terrain? The THEMIS visible-wavelength camera also captured an extremely interesting shallow, faceted formation to the north-west of the Cliff that shares a startling resemblance to the Fort. It is immediately apparent this formation is also one of Cydonia’s curious “collapsed mesas”. The idea that this is a collapsed arcology, or “super building”, is again

easy to adopt - implying unimaginable antiquity - because it is difficult to credit that this, and similar mesas with hollowed out centres, are natural features that have eroded from the inside out. In this particular case the edges of the proposed collapsed area have interesting architectural regularities, such as the straight edges of the collapse running parallel with one another.

Critics have dismissed the possibility that the features in Cydonia are anything but wind-sculpted mesas and buttes. The failure to find “roads” and “lawn furniture” (the latter suggested albeit jokingly) has been taken by the mainstream Mars science community to mean Cydonia cannot possibly represent the work of intelligence. This “terrestrial chauvinism” fails utterly to take into account the possibility of ENCLOSED living spaces, not the comparatively fragile acreage of New York, London, or Tokyo. The mainstream perspective also overlooks the fact that surface detail indicative of below-ground architecture is likely to have been heavily damaged or buried by millennia of drifting Martian sands. Nevertheless, the base of anomalous Pyramidal landforms features interesting angled “terraces”, and one otherwise inconspicuous mesa sports a row of bright rectilinear formations that look like terrestrial-scale buildings. Perhaps these are openings into a much more expansive subterranean environment. The huge “D&M Pyramid” itself has an odd dark square centred precisely on its southern facet.

The Mars Odyssey’s THEMIS instrument has also provided visible-light imaging for very large swathes of Cydonia. The area that has attracted most comment is a grid-like layout of the southern Cydonia landscape (about 120 kilometers from the Face) and involves a dense, broken landscape of mesas and hills. It is best covered in the Mars Odyssey’s image released to the public in March 2002. The irregular outlines of most of the outcroppings means that it is not immediately apparent that this is an organised landscape. However, if the imagery is viewed in a relaxed manner then it soon perceived that everything is arranged around an invisible system of grids. This effect could be due to erosional patterns in a landscape heavily criss-crossed by fracture lines - the area does seem to have once been part of the plateau seen in the immediate top right of this area. Yet there are some hints that this is an artificial landscape that is being exhumed by erosion.

More than one commentator has pointed out the outline of a large square: natural geological formation do not construct right-angled squares in the landscape! There are also a few cases of twin hills - the easiest pair to spot are the two large hills in the top corner of the “square” - they are very similar in size, shape and alignment. It is an awe inspiring speculation, but are we seeing the exhumation of a huge city of collapsed arcologies from overlying sediment? On Earth, in the Middle East for example, it would certainly be seen as a possible archaeological site. Geometric anomalies such as this - coupled with all the

other bizarre formations in Cydonia such as the D&M Pyramid, the Face, the “fort”, the “cliff”, and all the symmetries, alignments, and other enigmatic features too numerous to mention here, lend weight to the possibility that this controversial region was once home to intelligent beings. However, currently, the scientific establishment is not interested in exploring, at least publicly, these artifacts. With the current trend of superficial pop-skepticism which derail attempts to engage in meaningful exploration and serves to implant the idea that those who are interested in such things are wide-eyed lunatics.

On the 11th April 2007 NASA’s Mars Reconnaissance Observer (MRO) team quietly published the highest resolution image of “a popular landform in Cydonia” on their website. However, be forewarned - even the Mona Lisa will start to dissolve into a pile of pockmarks - if you get too close to her smile. Without the proper viewing distance even her luscious lips will begin to transform into swirls of pigment and fuzzy brush strokes and as a result - only support her detractors that she never had a smile, only an evil smirk! According to comments from the MRO team the “Face” image is one of the poorest quality images taken by the MRO to date. Although the image is not up to the usual crystal clear quality of almost all MRO pictures, the resolution of 11 inches to each screen pixel is still more revealing than the 2001 images taken by the Mars Global Surveyor (MGS). With the exception of the infamous “horned/unicorn” face and the highly filtered “catbox” face published by the authorities for unknown reasons, this highest resolution MRO image confirms all of the previous images of the face with respect to proportion, 3D interpretation, and details. It continues to fulfil numerous deductive or “a priori” predictions, which confirm that we are very possibly looking at an artificial object of immense proportions, in the shape of a human-like face on Mars.

Related links

1. 3-D perspective rotation of the “Fort” as if seen from the air (note geometry of base “platform” and sunken portion very suggestive of structural decay)
<http://www.mactonnies.com/fortphotos.html>
2. THEMIS image containing conspicuous “square” and additional suggestions of deliberate architectural layout in southern Cydonia (Face and other associated features are at top of image):
<http://themis-data.asu.edu/img/I01024002.html>
3. The Mounds Of Cydonia - A Case Study For Planetary SETI (published by British Interplanetary Society in the January 2007 issue of their journal):
<http://spsr.utsi.edu/articles/jbis2007.pdf>

Any thoughts to New Zenith or, I can be e-mailed at: alan.matthews3@jobcentreplus.gsi.gov.uk

Alan Matthews

Partial Solar Eclipse - August 1st 2008



How do the clouds know that one wants to look at the heavens? There I was, on Friday morning, all set up with the safety filter in place on the telescope ready to look at the eclipse. All I could see were two layers of cloud at different heights scudding past, although there were some breaks, they never seemed to coincide in the two layers.

This went on until about 5 minutes after the maximum when suddenly the cloud started to thin and a number of breaks occurred giving a clear view of the partial eclipse. I managed to focus the camera and get a number of pictures in the breaks, until just before the end of the eclipse when thick cloud and rain set in. Disappointingly there were no sunspots visible, but if you look carefully, the irregular edge of the moon (caused by mountains and craters) can clearly be seen.

It was highly reminiscent of the eclipse on 11th August 1999 when, I guess, we all remember Patrick Moore sitting on the beach in Cornwall with thick cloud talking us through a total eclipse. Oh well, there is a 75% eclipse due on the 4th January 2011 and a total eclipse on 23 September 2090, perhaps the weather will be better then!

For those interested in the technicalities: pictures taken with a Canon 450D at prime focus of a 90mm Maksutov telescope fitted with a home made ‘Baader’ filter. ISO 800 and exposures between 1/500 and 1/1000 of a second.

Please remember: NEVER look at the sun without a suitable filter.

Glyn Salmon

And now for something completely different!**From Blackberry Jelly to Galactic Electric Fields*****The Jelly...***

A previous editor (guess who) asked for jam making suggestions, particularly how to make it set - so here are my secret methods but if you try them you must take responsibility for appropriate safety measures!

The easiest blackberry jam to make leaves all the pips in - the way to deal with them is to cook your own crusty bread rolls, the toughness of the crust hides the grittiness of the jam - this is called 'impedance matching', the principles apply as much in mechanics as in electricity. Crusty bread rolls are made in moments - mix Allinson's self-raising wholemeal flour with water to a paste, spoon into lumps onto a buttered tray and bake to the required Mohr's hardness. A wet mix allows the lumps to settle into annuli in obedience with Newton's law of gravitation. Now's the time for making blackberry jelly!

1. Collect enough glass jars of varied sizes with lids, in advance. Wide necked pots are easiest to fill. (Fill in decreasing size order, 'Pluto' last.)
2. Use a stainless steel pan, with a lid. Discard aluminium cooking ware - it might cause Alzheimer's disease. The acid in fruit would dissolve extra aluminium.
3. If you have a gas oven - like us - then it helps to have a circular copper plate, just slightly larger than the bottom of the pan. It's so useful for cooking other things, like rice, without getting localised sticking, that I'll say more about this copper plate. Without a copper plate, then you're in for continual stirring, reading the NZ in one hand - mind it doesn't catch fire - and stirring with the other.
Occasionally you hear dramatic stories of hot water cylinders imploding. If you can get a scrap one, the copper sheet has so many uses it is well worth scraping off the insulation and retrieving the sheet - the toughest part of making blackberry jelly! Cut down the seams of the cylinder and open flat, using leather gloves and shears or you could scratch yourself far worse than picking blackberries. Draw round the base of your saucepan onto the copper and cut a circle half an inch bigger. Sandpaper the edges smooth. In use, the copper gets hot, so take precautions.
4. Pick your blackberries, an hour's picking can yield several pots of jelly, weigh the fruit if you wish, good places are: beginning of season, Los Altos park; end of season, Upper Adgestone Road. We can safely put our secrets into print because only a very select few read what we write!
5. Wash and drain the berries, tip the damp fruit into the pan, add no more water or you'll end up boiling the fruit for too long. Put the lid on, and simmer on the lowest gas,

using the copper plate. When the fruit breaks up and bubbles, stop heating.

Jelly-like jam sets with the pectin from the pips. Treacly jam forms by adding too much water, too much sugar, and boiling for ages. Don't add a lemon unless you like toffee. Use treacly jam with apples and water, no more sugar, in a Winter-warming pie.

6. Don't add sugar yet. Pour the hot mix into a metal mesh (hemispherical, like a ladle, same diameter as the pan, Tesco sell them) and catch the rich dark liquid that comes through into a receptacle.
7. Tip the sediment into the empty steel pan and add just enough water to stew the pips for a few minutes with the lid on, I believe this releases some more natural pectin. Strain the mix into the rich dark liquid already collected, throw the pips and wash the mesh before it dries.
8. Pour a quantity of sugar into the rich fluid, and set the mix to boil with the lid off the pan. The pan should be about half full before adding the sugar. I weigh nothing - Nature successfully created different species through natural variation, without weighing anything. If you must measure things, then the weight of sugar roughly equals the weight of fruit.
9. Get a small pot of ice from the fridge, arrange it so a tablespoon can be laid level onto the ice, with the spoon handle supported. From time to time put a sample of the simmering jam into the spoon. Examine how runny the test portion is when cold - when it sets enough, stop boiling the jam.
10. While the jam is cooling, in a smaller pan, about half full, get some water heated. With the lids off the glass jars, one at a time - perhaps goggles should be worn - I dip the base of the jar into the hot water and immediately withdraw it, allowing the heat to penetrate the glass, without cracking, dipping a few more times, several seconds between dips, the dips getting longer till the pot can be partially immersed, the neck of the pot still cool. The hot jam is spooned into each preheated jar, and the lid put on. Care is needed, if a pot breaks, doubts over where the splinters went spell the end of the jam in the pan.
11. As the pots cool, the near sterile air inside decreases in pressure in obedience to Charles's gas law, giving a vacuum seal. The blackberry jelly may set overnight, but it can still set in a few days if undisturbed - an interesting property of hydrophilic colloids, allowing you to move two points down the Mohr's hardness bread-roll baking scale. Sloe berries make a strong plum flavoured jelly by the same method - JL mixes his with apple - delicious!

We favour gas ovens over electricity - for soldering, glass blowing, and as MOT time approaches, we can heat our wheel hubs and bash the old bearings out, whilst contributing less entropy to the Universe.

...The Galactic Electric Fields

While the jam simmers we could talk about other things. Copper, a good conductor of electricity too, is used to make lightning rods. Lightning provides an interesting link to the philosophy of cosmology. Ever heard of 'sprites'?

Sprites, spotted from space, are strange phenomena occurring above thunder storms. Entirely unpredicted, they consist of upward discharges emitting light, x-rays and gamma rays and physicists puzzled to explain them. Until observed, they were outside the field of our imagination.

The lesson for cosmology must surely be that when we think we understand something, nature can still spring baffling surprises! I'm skeptical of computer modelling of our Universe, it can produce pretty pictures, but when weather forecasting is so imprecise, limited in time, and often wrong, computers must always be like toys compared to the real Universe. So me and my brother spend time looking at other ways to explain things.

Spiral galaxies are spinning, so there must be a cause. A fundamental principle of mechanics is conservation of angular momentum. An object cannot start spinning of its own accord unless an external torque be applied. Hence when we look at a spiral galaxy and wonder what set it spinning, we seem to be looking for another spiral galaxy nearby spinning oppositely to compensate, and a creative interaction in the past that set them going. Mechanics says one spiral galaxy can't have started spinning on its own - but what about with help from electromagnetism?

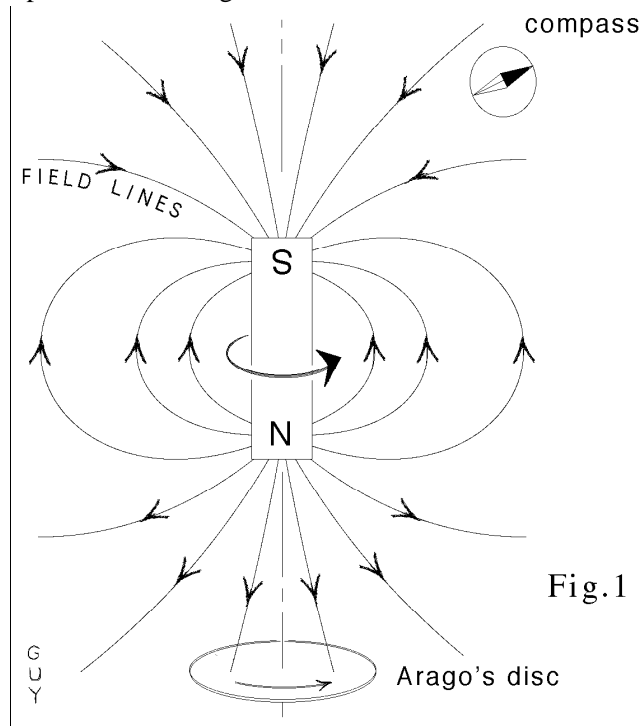


Fig.1

We hear a lot about magnetic fields in space, but, puzzlingly, precious little about electric fields. A copper sheet is not ferromagnetic, but push it between the poles of a powerful magnet and you can feel a resisting force due to eddy currents in the copper. Moving magnetic fields are accompanied by electric fields that can induce currents.

Many deductive puzzles can be dreamt of and tested with magnets. Take the vertical bar magnet in Fig.1, and a nearby compass indicating the direction of the magnetic field. Now spin the magnet around the vertical axis. The magnetic field strength doesn't vary, so the compass tells you nothing has

changed, but the field is now spinning, and will induce currents in a copper disc. If the copper disc is free to rotate, the spinning magnet causes the disc to rotate - a fascinating experiment, performed by Arago, perhaps it still features in the Science Museum Physics Gallery.

Dominique François Arago (1786-1853), secretary to the Paris Observatory and mathematics professor, suspected by the Spanish as a spy, was imprisoned while extending the meridian from Barcelona to Fourmentura. Returning to Marseilles in 1809, elected to the Academy of Sciences, he laid the optical foundations of chromatic polarisation. Laplace and Humboldt were amongst his eminent colleagues, but Brissot, an old school friend, put Arago into a jam by confiding in him his plans to assassinate Napoleon and "to rid the country of the tyrant who stole her liberties."¹

Now is a torque required to spin the magnet in Fig.1? About its long axis, I'm not immediately sure - yes if there are conductors nearby - but certainly yes, when spun about a perpendicular axis. So magnetic fields can carry angular momentum. When you wonder about the mechanical spin of a spiral galaxy, in theory it is possible that the galaxy possesses an equal and opposite electromagnetic spin, so the total spin might be zero. If this were true, then the whirling magnetic fields would be accompanied by electric fields - inextricably linked by Maxwell's equations which unified electricity and magnetism. So shouldn't we be looking for electric fields near to and inside spiral galaxies?

The next stage in this imaginative excursion, is to realize that magnetic and electric fields possess energy density, and via Einstein's famous equation, $E=mc^2$, possess mass density - in other words **the magnetic and electric fields in space would be responsible for an invisible mass** but this doesn't seem to feature in current thinking in the search for the 'missing mass' needed to close the universe and stop it expanding, and so on, if you believe in that kind of thing - which of course we don't - think of sprites, and - oh! - the blackberry jelly!!!

Reference

1. *Biographies of Distinguished Scientific Men*, François Arago, London, Longman, 1857 (very entertaining!).

Dr. Guy Moore



Another image of the recent partial solar eclipse
Tony Williams



News From Around the Web

Starlight

'Starlight' is a free space and astronomy newsletter for young adults. The first issue was published with a grant from the Royal Astronomical Society and financial backing from the Faulkes Telescope Project, as well as editorial support from the Society for Popular Astronomy. The intention of 'Starlight' is to bring the sense of wonder, excitement and fun that we feel about space and astronomy to today's schoolchildren, encouraging them to have a greater appreciation for the Universe around us and the Earth's place within it, and encourage young people to take up more of an interest and study science. With the International Year of Astronomy in 2009 this is the ideal time to take up an interest in all things going on out there in space. Our motto is 'educating whilst entertaining' and we hope that 'Starlight' will play its part in creating the scientists of tomorrow.

<http://www.starlight-news.co.uk/>

Giant Astronomical Survey Completes Its Mission

Skynightly.com - Aug 18, 2008

After a decade of construction and eight years of operation (SDSS-I, 2000-2005; SDSS-II, 2005-2008), the Sloan Digital Sky Survey (SDSS) completed its observations in mid-July and will release its final data set to the public in October. SDSS-III, a six-year program composed of four new surveys, has now begun, using the same telescope.

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Martian Clays Tell Story Of A Wet Past

Marsdaily - Aug 18, 2008

Layers of clay-rich rock have been found in Mars' Mawrth Vallis, a potential landing site for future rovers. This work, published in the August 8 issue of Science, suggests that abundant water was once present on Mars and that hydrothermal activity may have occurred.

[Read More...](#)

Mars Phoenix Camera Sees Morning Frost at the Landing Site

The Surface Stereo Imager, or SSI, on NASA's Phoenix Mars Lander has seen water frost on the ground around the spacecraft's landing site.

Water frost appears in an image the SSI took on Aug. 14, 2008, at 6 a.m. local Mars time on Sol 79, the 79th Martian day after landing. The frost begins to disappear shortly after 6 a.m. as the sun rises on the landing site.

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India has Big Plans for Lunar Exploration

India will send their first mission to the Moon in September. Chandrayaan-1 has been built and will be launched from Indian soil and sent on a mission to study the lunar surface. The Indian Space Research Organization (ISRO) will use its highly successful Polar Satellite Launch Vehicle (PSLV) to get the lunar probe into space. This is an impressive mission for a small space agency, making huge strides in the exploration of space.

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THE UNIVERSE
YOURS TO DISCOVER



INTERNATIONAL YEAR OF
ASTRONOMY
2009

Quotes

"If you want to make an apple pie from scratch, you must first create the universe."

Dr Carl Sagan

"Nothing travels faster than light, with the possible exception of bad news, which follows its own rules"

Douglas Adams

"Duct tape is like the force. It has a light side, a dark side, and it holds the universe together."

Oprah Winfrey

Observatory

For your own safety when visiting the VAS observatory, please remember to bring a torch. Also, please make sure you close the car park gate if you are the last to leave.

Articles Needed

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