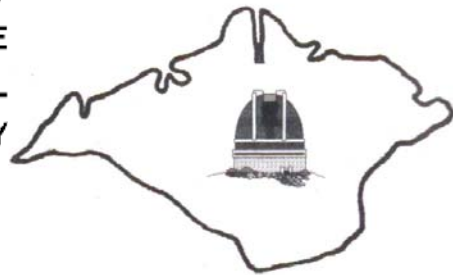


THE NEW ZENITH

THE MONTHLY
MAGAZINE OF THE
VECTIS ASTRONOMICAL
SOCIETY



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AUGUST 2007

SOUTHAMPTON LASER PROJECT FAREWELL

In a surprise move in July, the newly-elected Conservative Council decided to heed the myriad protests levelled against the City's Laser Gateway project, and cancelled the entire exercise. Members will be aware that the plan was to fire off four powerful laser beams along the north, south, east, west axes from the top of the Civic Centre clock tower. Almost £250,000 would have been spent on the installation, funded by the UK Government organisation, SEEDA (South-East England Development Agency).

Had the wishes of the previous Council come to fruition, some of the Isle of Wight's famous dark skies would have been compromised over the area of Newtown Creek.

A huge uprising of public protest against the proposals rocked the Council Chamber when the plans were originally unveiled. Along with other astronomical societies, VAS declared that an increase of light pollution within the Island's airspace could not be tolerated.

The project had been put on hold pending a trial of the system later this year when evenings got darker but common sense has obviously prevailed and the *coup de grace* administered.

In an email to the VAS Director of Astronomy Services, Ros Cassy wrote:

“Thank you for your correspondence expressing your views on the above proposal. You may have seen recent publicity regarding the decision taken by the Southampton Partnership and Southampton City Council not to proceed with the trials for the proposed Laser Gateway project.

This project was conceived as an innovative way of promoting the city and its heritage, however we have listened to what people have said and want our efforts to improve the image and perception of the city to have widespread support. This project did not have that support and therefore will not go ahead. Factors included in this decision were:

Continuing public concerns regarding light pollution and disturbance to the night sky of neighbouring authorities,

The increasing costs of holding the trials and conducting a full appropriate assessment of the effect on the environment

The likelihood that the trials would not have had a conclusive result and that further tests would have to be undertaken over a longer period of time than originally anticipated.

The Partnership is working with the City Council and others to explore other ways to raise the profile of Southampton and celebrate its many assets which include maritime heritage, extensive parks and open spaces, varied cultural and artistic events, a fine record on innovation and on responding to climate change.

We have some exciting ideas under consideration and are consulting with other stakeholders on options to take forward.

Yours sincerely

Ros Cassy

Chair of Southampton Partnership”

FROM THE EDITOR

Dear Readers

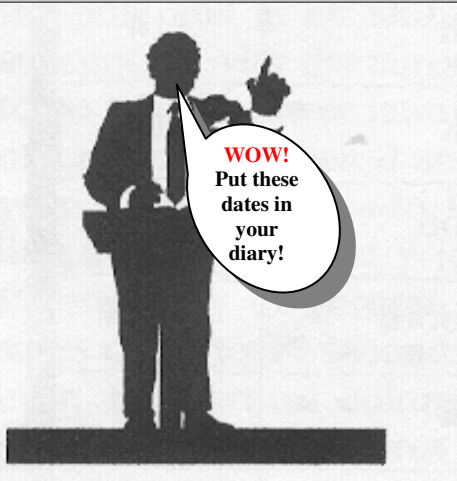
An extra-large issue this month. Hope it doesn't cause too many problems for the postal team sending out paper copies to all who do not attend our Newport lectures.

Don't forget that, if you do come along regularly, the August lecture evening will begin at 7:00 pm to incorporate the AGM. Details appear below. And, as a special treat, there will be an extra lecture on the 25th August at the Newchurch Pavilion at 6 pm. More details below. This meeting will incorporate an American Supper, ie all those coming along are expected to bring something tasty to consume afterwards. No guarantees as to the ensuing menu but it should be very interesting, as they say...

Hope to see you all there?

All the best 

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AUGUST 25TH

There will be an extra lecture on the above date at the Newchurch Pavilion, next to the Observatory in Watery Lane.

No. 8 bus stops right outside - ask for Thompson's Garden Centre.

STOP PRESS NEWS

Space Shuttle Mission STS-118 **Endeavour** is due to lift off on its mission to the ISS on 7th August.

AUGUST LECTURE
DARK MATTER
DARK ENERGY

Presented by
 Dr David Bacon
 (Portsmouth University)

PLEASE NOTE
This lecture will follow the AGM which commences at 7:00 pm
AUGUST 24TH

Parish Hall
 Town Lane
 Newport

(ALSO NOT AS IN THE PROGRAMME CARD!)

Prof Ian Morrison will be talking about 50 years of the Jodrell Bank Radio Telescope.

Commissioned just in time to track the first-ever man-made satellite, Sputnik One, Jodrell Bank wrote its own place into history way back in 1957.

Meeting is timed to start at 6 pm.

Don't miss it.

Stars That Go Bang in the Night

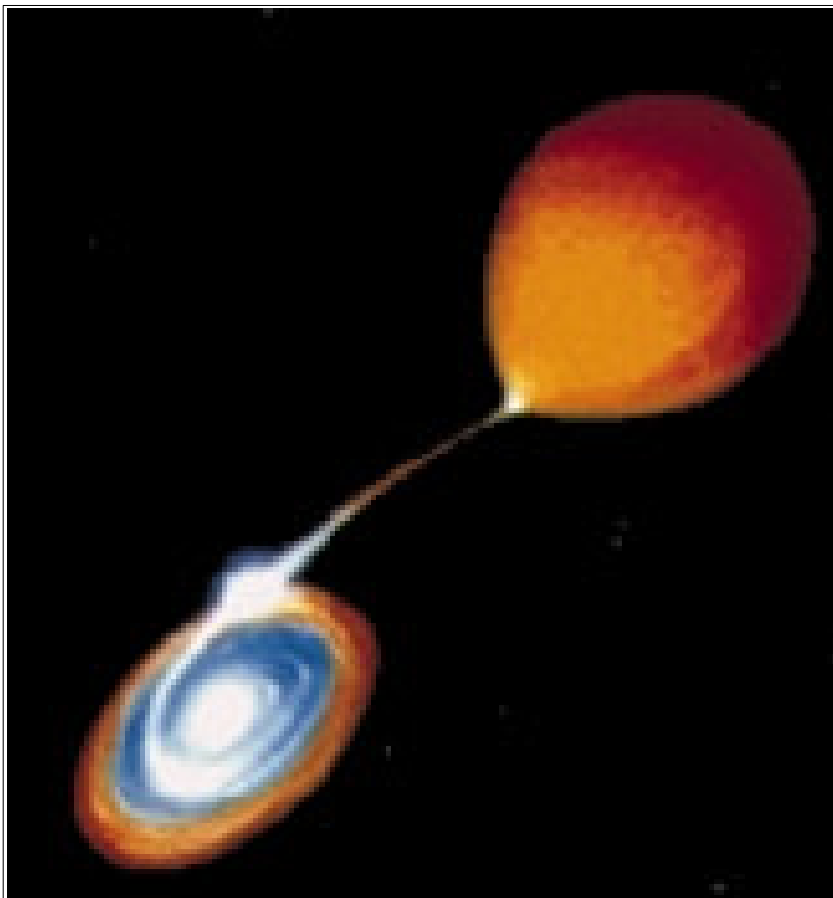
Dr. Robert Smith

Sussex University

Astronomy Centre

The biggest stellar explosions are supernovae but other stars also show eruptions. These are novae and dwarf novae. Both are examples of cataclysmic variables (CVs) and are close binary stars where mass is being transferred from one star to the other. They comprise a red star, normally a dwarf, and a compact star – a white dwarf or neutron star – with a mass flow from the red star onto an accretion disc round the compact companion. The point where the mass flow falls onto the accretion disc is marked by a bright spot.

These objects can be recognised by their light curves. Novae exhibit a single bright outburst to more than 10,000 times their quiescent brightness recurring over an interval of the order of 10,000 years. Dwarf novae have much smaller outbursts – typically 100 times their normal level – but they recur over periods from a few months (SS Cygni) to a few years (DO Draconis). However, there can be big variations in this periodicity and in the magnitude of the outbursts. Some dwarf novae have long quiescent periods known as standstills, when no outbursts are seen (e.g. Z Camelopardalis), while others (e.g. VW Hydri) have a mixture of normal and super outbursts.



*Picture by Vik Dhillon,
University of Sheffield*

In a nova the huge outbursts of energy are the result of thermo-nuclear explosions. Hydrogen from the outer layers of the red star is transferred via the accretion disc uniformly onto the compact white dwarf. This has already burnt its own hydrogen so the new material forms a layer on the surface. Gravitational pressure causes the temperature to rise until nuclear fusion can start at the base of the layer at which point an explosion occurs removing all the hydrogen and the process can start again.

In dwarf novae the matter gets trapped on the accretion disc and is released from time to time in large lumps. The amount of matter present in the disc at any time and the temperature of the disc material affect the friction (viscosity) between the

dust particles. However, the rate at which matter is falling from the red dwarf is independent of the viscosity of the disc material. For a given density it can be shown that there are two dynamic models for the disc – low viscosity and low flow rate of matter through the disc or high viscosity and high flow rate. The system will flip between the two states which represent the quiescent mode and the peak of the outburst respectively.

Variations in the accretion rate from the red star will cause the system to move from the stable state (nova) to

unstable (dwarf nova). These variations could be the result of radiation from the disc heating the red star. This simple model does crudely explain the light curves observed. However, to explain the detail requires a more detailed model and consideration of many factors, for instance the effect of sunspots on the red dwarf.

Reported by Roger Young

August Skies

John W Smith

The Planets

Mercury reaches superior conjunction on the 15th and will not be favourably placed again until the Autumn.

Venus will appear towards the end of the month as a morning object and once again will become a superb object for viewing.

Mars lies close to the Pleiades early in the month and for the rest of this period will remain close to the brighter stars of Taurus.

Jupiter is now an evening object, but is still quite prominent in Scorpius.

Saturn is now unobservable.

Uranus and **Neptune** are close to opposition but a good star map is necessary to locate these tiny objects. Uranus is brighter in a shade of pastel green and easier to find but a good telescope is necessary for Neptune which appears bluish.

Meteor Showers

There are five showers that peak this month.

1. On the 2nd the alpha *Capricornids* are unfavourably placed and display about 5 meteors per hour.

2. The iota *Aquarids* occur on the 6th with a rate of 10 per hour.

3 The delta *Aquarids* appear a day later with a similar rate.

4. The *Perseids* are the main shower of the month with an anticipated rate of 80 per hour and will occur on the 12th/13th and the Moon will not intrude for viewing.

5. The alpha *Aurigids* are unfavourable on the 28th with a rate of 10 per hour.

Moon Phases

New	1st Quarter	Full	Last Quarter
12 th	20 th	28 th	5 th

Deep Sky Objects for small telescopes and binoculars

M29 NGC6913 An open cluster of about 20 stars very close to the star Gamma Cyg, in the centre of the Northern Cross.

Veil Nebula A fine remnant of a supernova and a favourite for photographers. It covers a fairly wide area and some sections are brighter and easier to observe than others.

M39 NGC7092 This open cluster of some 25 stars lies in Gemini about 3000 light years away and a low power instrument will resolve it.

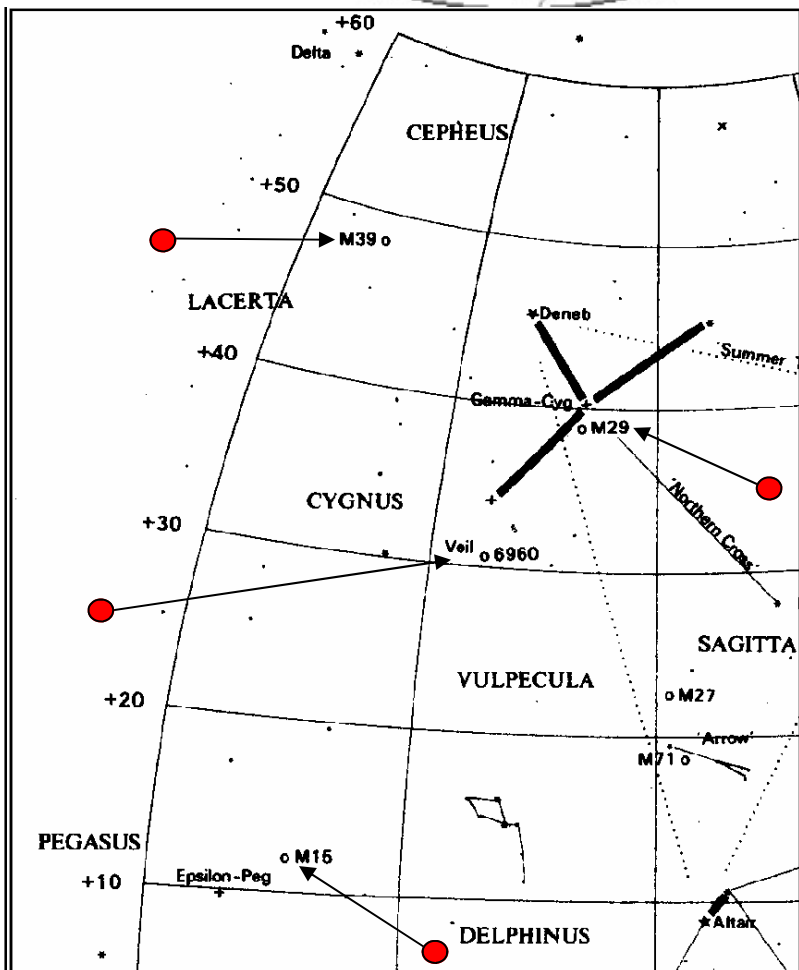
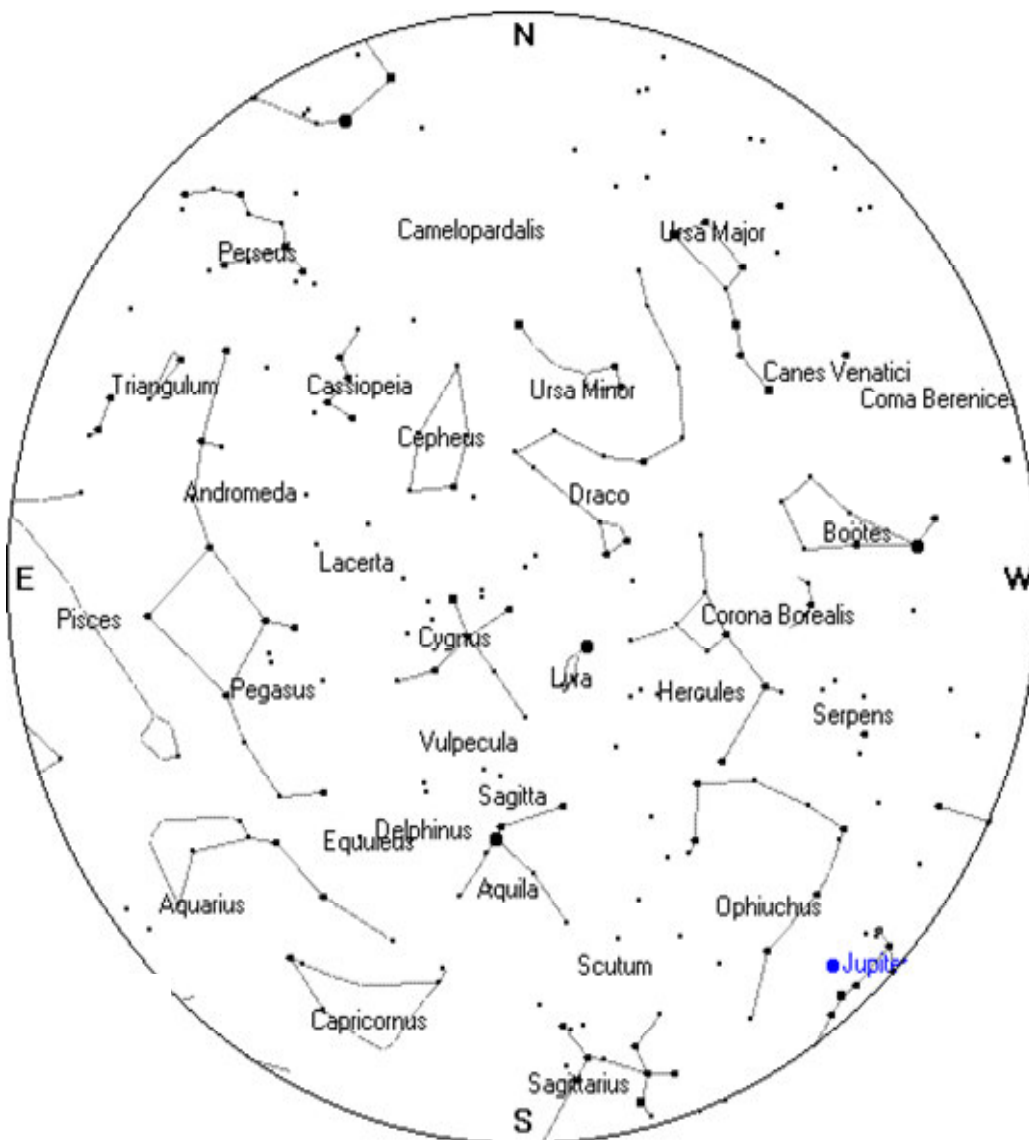
M15 NGC7078 A good globular cluster in Pegasus about 35,000 light years distant. Fairly compact but is easily located with binoculars. High power is needed to resolve the outer stars.

Coordinates

OBJECT	RA	DEC	MAG	SIZE (Arc mins)
M15	21h 29m	+12deg 05m	6	7.4
M29	20h 23m	+38degs 27m	8	12
M39	21h 32m	+48degs 21m	6	30
Veil	20h 55m	+31degs 30m	*	*

*not quoted in my books.

AUG 01	at	24.00
AUG 15	at	23.00
AUG 31	at	22.00



MULTIPLE OCCULTATIONS

On the night of the 7th August, just after 01:00 hours, the waning crescent Moon will begin to pass across the Pleiades Cluster in Taurus. There will be many star disappearances over a period of two hours.

As if that were not enough to see, Mars will also be at its closest this year to M45, lying 5° below the Moon.

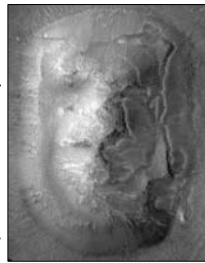
The Martian Enigmas Part 4

Alan Matthews

Along with NASA's and the European Space Agency's (ESA) demonstrated troubling refusals to comply with scientific method and acknowledge the work of independent researchers, numerically valid evidence of extraterrestrial intelligence such as the "Face on Mars" and associated features have been systematically relegated to the fringe and simply left ignored. Unfortunately, the Mars Face doesn't fall into academically palatable models of how extraterrestrial intelligence could reveal itself. Searching for radio signals is well and good but scanning the surface of a neighbouring planet for signs of prior occupation is met with a very carefully cultivated institutionalised scorn. With the idea that extraterrestrial civilizations will necessarily forego interstellar travel because of the daunting requirements of chemical rockets - a sentiment lifted directly from our own manned space program. Indeed, SETI's long-held contention that beings thousands or millions of years more advanced than us would be constrained by Apollo-era technology (already near-obsolete here on Earth) has always seemed something of a convenient anachronism for researchers content to keep the study of extraterrestrial intelligence comfortably academic. And these cosmic pen pals are so far away that their bodies, their arts, their emotions, and their personal motivations can be easily ignored. SETI then becomes a nice little theoretical exercise. The possibility that advanced intelligences might not choose to communicate with us through such a tiny or limited technological aperture, but perhaps seeking perhaps some fuller opening of our consciousness, seems not to have occurred. Perhaps the "aliens" (whatever that word might ultimately mean) were/are not unimaginably distant after all. Indeed, it's not impossible that "they" have some esoteric connection to us, as evidenced by the fact that the Face is demonstrably humanoid, speaking to the symbolic and aesthetic side of our culture rather than a purely scientific one, suggesting a galaxy vastly more colorful than that painted by SETI's arid Drake equation.

Often, advances in science are the result of analysing a new phenomenon from different perspectives, from seeing the same thing in different ways. It has long been recognized that while the "Face on Mars" possesses a high degree of symmetry in terms of its underlying structure; internally, while consistently face-like in a gross sense, the actual facial features are far from symmetrical, the higher resolution images having confirmed this - debunkers, as you can imagine, party deep into the night after this cursory observation. On its western side, the Face features a parted "mouth" with evidence of eroded "lips," a protruding, almost simian "brow," "nostril," and a readily discernable "eye"

complete with conical "iris." The eastern side is less hominoid. Nevertheless, it is hauntingly face-like, with a slit "eye," continuation of the mouth, a nostril-like feature next to its western counterpart, and a "chin" area that has apparently collapsed inward in several places. There are two dominant (and mutually exclusive) theories that have been put forth to account for this apparent facial asymmetry. The first is the a speculative deliberate protective "casing" forming a "two-sided Face." Viewed from our frustrating vantage in Mars orbit, the Face appears to be a bifurcated structure: undeniably the eastern half has a discernable feline appearance. This visage appears in proper proportion, and is not the result of selective choosing. A deliberately designed - aesthetically intended - split-image Sphinx-like motif perhaps? Although this explanation may sound dangerously *post facto*; this *a priori* observation (that the two halves were designed to encode hominid/feline imagery) had been made years ago based on relatively poor-quality 1970's Viking data.



I have tested this split face feline notion by using high-resolution image E03-00824, presenting "blind" viewers - those unaware they were looking at a formation on the surface of another planet - with a mirrored photograph of the Face's eastern half. In the words of one participant, "It looks like a lion"; a mirrored western (left) half giving an ape-like "proto-hominoid" profile. What does seem an interesting coincidence is that (when adjustments are made for foreshortening) the mirroring of the "Ape-man"/"Lion" faces works best when the Face is cut down its dead centre with a line running directly parallel to the straight western edge of the Face platform. A 50:50 bilateral split: seemingly a perfectly symmetrical fusion of the hominid/feline. Although this proves nothing, there are indeed innumerable terrestrial examples of precisely such "split faces," for example among the former Central American Mayan civilisation - in ceremonial human/cat split-imagery pottery masks (Man/Jaguar representations), architecture, and glyphs. (By the flawed, twisted logic of the detracting fraternity, these handcrafted intentionally asymmetrical facemasks could not possibly be Man-made since they are not perfectly symmetrical.) There is also an ancient Hebrew text (biblical Old Testament - Ezekiel 41:18 and Ezekiel 41:19) describing Ezekiel's vision surrounding the statuary that would someday adorn the rebuilt Temple in Jerusalem that dictates Man/Lion split face imagery. Also, in Ancient Hindu myths Mars is depicted as *Nr-Simha*, meaning the "Man-Lion". The memes headdress, the one we are so used to seeing on images of Egyptian Pharaohs, is designed to represent the mane of a lion, with the features of the ancient Egyptian Great Sphinx representing this fusion of hominid/feline in its structure (ancient Sphinxes were usually placed at entrances to palaces or temples of antiquity. This positioning implied power, authority and protection.)

Continued from Page 6

So, the specific nature of that union -- the Man/feline hybrid - uniquely speaks of a very sacred, very ancient human tradition - across not one, but several human cultures - that reinforces the notion that the apparent asymmetry of the Cydonia Face could be in fact intentional. Is it a case of "Mirror, Mirror on the Wall - Who's the Prettiest Kitty of Them All?" ESA's September 2006 release of Cydonia imagery from the **Mars Express** spacecraft, includes 3D generated perspective views of the Face, which confirm the "leonine" aspect of the eastern side of the Face as already seen in NASA's 1976, 1998, 2001 and 2006 images. But before we prematurely "Let the Cat Out the Bag," the other theory that have been put forth to account for the facial asymmetry is a provocative case explaining the "distorted" eastern portion as the result of erosion and sand accumulation. It has been noted that the Face is located near the 0 km datum at what would be sea level if Mars had an ocean. As either a shoreline feature, or even a possibly island, the Face's proximity to water provides a possible explanation for how this once-symmetrical structure could have been transformed into its present, collapsed and highly eroded state through wave-action. Computer-generated perspective views suggest the presence of sand dunes on the eastern (right) side of the Face. It is possible that the dunes are the result of the prevailing westerly winds in Cydonia - winds scouring the western side of the Face, and depositing the eroded material on the leeward (eastern) side. The depth of the sand is sufficient to obscure much of the detail on the right side of the Face, including a matching eye that is believed to exist based on the documented analysis of the symmetry and shape of the Face. In addition, there are indications on the Face that internal features have collapsed and become highly eroded, like the rest of the formation. For now, further studies on the validity of the "blanket of dust" vs. the lingering and portentous question of the "feline hypothesis" for the Face will have to wait the use of orbital ground-penetrating radar (shape-from-shading computer algorithm analysis suggests that the eastern half is taller than the western half; whether this is due to a build-up of sand or to artificial structural casing remains to be seen). The mainstream's definition of SETI needs to be expanded to include the study of possible artifacts in our Solar System, otherwise answers will remain forever elusive. Any thoughts to New Zenith or, conversely, I can be e-mailed at:

alan.matthews3@jobcentreplus.gsi.gov.uk

Related links

Analysis of THEMIS multispectral imagery showing evidence that the Face is located along a possible ancient shoreline in Cydonia:

<http://newfrontiersinscience.com/Papers/v01n03b/v01n03b.pdf>

3D digital model and analysis of the erosion on the Face on Mars:

<http://66.70.204.112/cydoniacontroversy/papers/newFOM3d.pdf>

These Figures are what should have been shown in the July NZ, in Dr Guy Moore's article

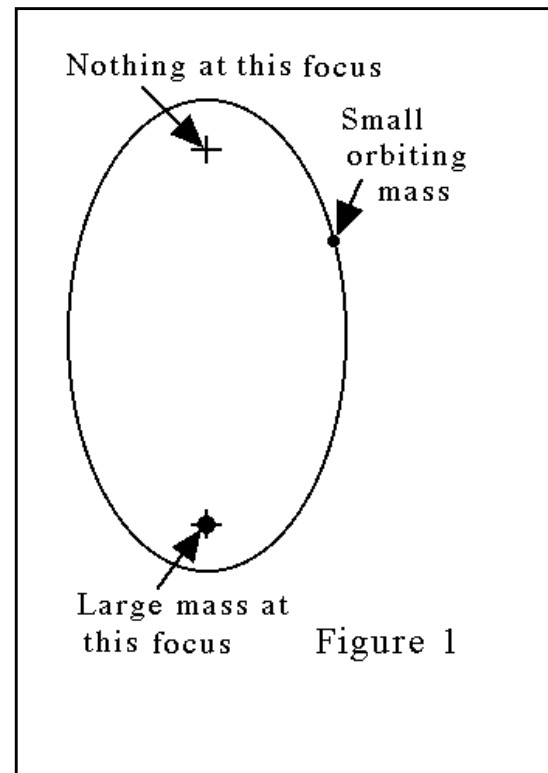


Figure 1

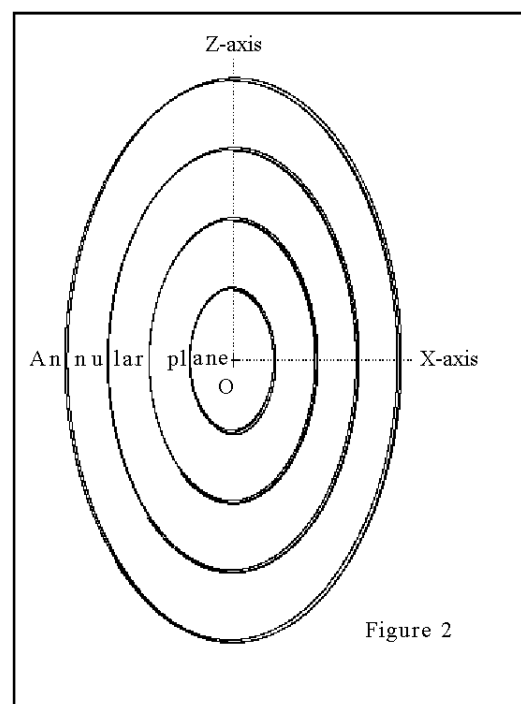


Figure 2

Runaway Global Warming or Normal Climate Change?

The debate continues: Jules replies to John Smith's arguments:

Any scientific theory has protagonists and antagonists. Usually the public can simply sit back and leave the professionals to sort it out among themselves.

The current debate is different because it appears that governments are planning drastic and expensive measures on the basis of exaggerated forecasts of temperature increases for the present century based upon an unproven theory which claims to explain the small increase of 0.6°C degrees in global temperature during the last century.

The International Panel on Climate Change (IPCC) theory that this small increase has been caused by an increase in atmospheric CO₂ consequent upon the burning of fossil fuels is superficially plausible in that the temperature rise has accompanied CO₂ increase, but it may be a simple matter of coincidence and the theory ignores, and the 2001 report conceals, the fact that climate change has been occurring throughout geological time without the intervention of mankind burning fossil fuels.

Further, it is well known that climate responds to multiple factors and that the Sun has increased in activity relative to its period of low activity during the Little Ice Age, so that it must be responsible for at least some of the subsequent warming. It is only by claiming CO₂ increase as the sole cause that the panel has managed to present its scary forecasts.

We are repeatedly told that CO₂ is the most important greenhouse gas. In fact water vapour ranks far higher: CO₂ at its present level of a mere 1/30th of 1% comes a poor second. In any case the fact that there was an Ice-Age around the Jurassic/Cretaceous boundary at a time when atmospheric CO₂ stood at 2,000 parts per million, about 6 times its present level, shows that it is not a very effective insulator and cannot be a prime mover in climate change.

The Panel implies that that increasing CO₂ ended the last four ice ages. Had they superimposed the two graphs from the Vostok ice core recording temperature and CO₂ on the same printout, they would have seen that temperatures peaked between 400 and 4,000 years ahead of CO₂ maxima. Since effects can never precede their causes, they got the relationship reversed.

IPCC do not attempt to explain where all this extra CO₂ came from. The likely explanation is that the oceans hold huge amounts of CO₂ which comes out of solution into the atmosphere as they warm. However, due to

water's high specific heat, oceans warm more slowly than land or atmosphere and therefore peak later.

I have looked with interest at the global temperature graphs for the last millennium published by the IPCC in 1996 and 2001 which show striking and unexplained differences.

The former clearly shows the Medieval Warm Period and the Little Ice Age, both of which are well documented by history and geology, and could not have been caused by mankind burning fossil fuels.

The latter gives great prominence to a 'revised' graph which 'loses' both these well-known episodes, and purports to show a stable 900 year period with climate change occurring only in the last century. This gives the entirely false impression that it is only Man's intervention that has caused climate change in the millennium. In fact there have been *eight* warm periods during the 12,000 years of the present interglacial, none caused by Man burning fossil fuels. This fictional representation of temperature levels during the millennium was achieved largely by incorporating proxy temperature measurements obtained from the varying widths of annual growth rings from Bristlecone pines which the '96 UN report had itself warned was an unsafe method of estimating temperature.

The Internet suggests that the limiting factor in Bristlecone Pine growth is rainfall, so maybe the Panel has misinterpreted a proxy rain gauge as a thermometer! In any case 2 sets of Bristlecone Pine graphs were published in the 2001 report- one from N. California and the other from Arizona. They showed peaks and troughs at very different times, so the Panel gave the California set showing an upturn at the end of the century, which suited their theory, 390 times the weighting of the Arizona set.

The US National Academy of Science has issued a statement that the 2001 temperature graph is defective, but UN publications continue to use it.

As a footnote that adds a touch of reality to these theoretical debates – in 1988 a Lightning P38 fighter plane was extracted in pieces from beneath 280 ft of ice from the Greenland Ice Cap where it had made a forced landing in 1942. In the intervening 46 years these 280 feet of ice had accumulated above it!

Personally I favour the 'Chilling Stars' authors' heroic and comprehensive attempt to explain climate change over hundreds of millions of years, and reject the IPCC's heavily edited version of the last millennium's climate which it uses to forecast a fictional future!

Jules

Editor's note *The airplane referred to in the penultimate paragraph above has been reconstructed and recently was being flown home. Unfortunately, it suffered problems en-route and had to make an unscheduled landing. It is expected that, eventually, it will arrive*

SAGAS SUMMER MEETING

14th July 2007. The *IW County Press* weather forecast had promised overcast skies and poor visibility. The day dawned fresh and clear, just to defy the odds. The Sun was bright enough to warrant bringing out the VAS solar telescope. So much for forecasters...

The Newchurch Pavilion was bursting at the seams with SAGAS visitors and VAS Members. Rosemary and team had set tables groaning with enormous quantities of food, ready for lunch - in the kitchen, kettles and urns steamed ready for astronomical thirsts.

But back to the main events. John Mason announced that he planned to talk about Mars Exploration Updates for an hour, after which he had to depart (like Cinderella at Midnight?) since he had to give another talk in Milton Keynes that evening. True to his word, John presented

an enthralling series of extremely high definition images of various parts of the Martian landscape and the exploration vehicles down there. The best pictures showed a definition of 30cm per pixel, an improvement factor of 5 over the previous best

at 150cm per pixel. He said that orbiting craft could see objects below around 1 metre square in size. He ended by describing the Phoenix Mars Lander spacecraft due to launch in August and arrive on station next May. Literally, watch this space. Amazingly, the concept of time had been much distorted at this moment as we found that John had been speaking for exactly 60 minutes and away he swept into the distance heading for the ferry.

Following an excellent lunch came the SAGAS business meeting which was soon done and dusted. The first afternoon speaker was Graham Bryant describing a new American-made light meter, specifically designed to measure quality of dark skies. Costing around £100 (\$100 Stateside) each, Graham recommended that all astro societies should get one and join the campaign to provide actual light pollution measurements to Local Authorities (LAs) in order to reverse the trend of destroying precious dark skies. A big problem nowadays was due to Private Funding Initiative (PFI) organisations taking over provision of public utilities such as street lighting and leasing back their services to the LAs. An identified shortcoming was a lack of consultation on lighting design resulting in PFI installing non-optimum systems at a minimum cost. Too late once installed, it

would take a lifetime of at least 25 years before any improvement could be made.

VAS intend purchasing one of these light meters as an aid in the battle against light pollution on the Island.

Next up was Ninian Boyle who gave an in-depth talk on the Sun and the dangers of viewing it directly. The only 100% safe method was the indirect projection of the Sun's image onto a screen. However, if one is still inclined to stare at our star, then a quality solar scope is the answer. Ninian warned that there are a lot of cheaply-made instruments on the market that do not have thermal filtering until the eyepiece. This results in the glassware becoming very hot with the risk of the lens shattering into the user's eye. His advice about such poor investments? "Dump them, but stamp on them thoroughly first!"

After tea break, our own Peter Burgess went deep into the human eye and its physical characteristics. To astound and amaze, Peter gave a series of slides that had the audience gasping with disbelief. Having seen his presentation, surely nobody could have left with the thought that their eyes, and what they saw, were to be believed. Straight lines that appeared curved, colours that changed value and hue according to their surroundings, and shapes that could be seen yet truly didn't exist: they all were there to behold. Even Richard Flux's *Technicolor Dream Shirt* looked as if it had had the Burgess treatment! An outstanding presentation to round off a brilliant day. Peter should be forced to give this talk once more, at one of the regular monthly VAS meetings.

The audience thoroughly praised the impeccable organisation of the meeting and thanked Richard for his part in it and also showed their appreciation of the refreshments so well prepared by Rosemary and her team of kitchen slaves.

John Langley



Spiral Galaxy Simulation, Part 5 Hooked on Gravity

Dr. Guy Moore & Dr. Richard Moore

Over the years we have both worked on gravity, usually at different times. My brother Richard, who developed programs for 3D Voronoi tessellations more than two decades ago (this has applications to galactic foams, another story you may hear about later), examined the writings of Robert Hooke. In a nutshell, it appears that Hooke, knowing of Newton's mathematical abilities, communicated his ideas to Newton to develop. It appears indisputable that Hooke has been given too little credit, especially concerning his role in initiating work on the inverse square law of gravity. It therefore gives us pleasure during our sojourn on the Isle of Wight, Hooke's birthplace, that we should find ourselves making a small contribution to the knowledge of gravitation and so we dedicate the rather special computer program below to his memory. This program produces the "Ellipses Extraordinaires" discussed in Part 4 (the crucial Figure 2 p4 of July NZ requires the horizontal scale to be halved, but never mind...) In this Part 5, you can see an Ellipse Extraordinaire appear before your eyes on your PC.

To make it clear that there are no tricks, brief details of how the program works are given, but try the program first, using the BBC Basic Emulator available on www.rtrussell.co.uk.

Fig.1 gives the geometry and some formulae. The plane annulus consists of point masses distributed in the manner described in Part 2 (May NZ), but with the z-dimension included. For every mass in the ring, Hooke's inverse square law (we take the liberty to call it that for now) which he communicated to Newton in 1681 is used to compute and sum the force components F_x and F_z , parallel to the x and z axes respectively. A star is launched parallel to the x-axis into a 'polar orbit', from a point at height Z up the z-axis. Local gravity at the star is computed per clock step, plus the new velocity and plotted-position.

When you RUN the program, an elliptical orbit appears, the plane of the annulus is given by the horizontal line. When complete, click in the Editor window, pull down from RUN to STOP, and try a smaller launch height (Line 120) - whatever the height, for this launch velocity, an elliptical orbit appears - a fascinating characteristic of this 'special annulus'. The launch velocity (set in Line 130 as Velx) is expressed in terms of the rotation velocity (VELROT) of the simulated spiral galaxy. To see various chaotic orbits RUN the program with Velx set to various numbers such as 0.4, 0.5, 0.8. Now set Velx to 1 (giving the rotation velocity at launch and Z=200) and see the star pass through the annulus, do a slow about-turn (be patient! - at times the star travels

slowly) and then races through the centre of the galaxy. Perhaps **the most astonishing orbit of all**, is obtained by setting Velx=1.37 and z=80. This is an 'oscillating orbit' tracing a pattern with similarities to the Gateway Arch at St.Louis! - see Fig.2 - **this is the complete orbit!** Given how far Hooke and his contemporaries travelled, then it is good to associate this computer program dedicated to Robert Hooke with travelling and discovery. Several other repeating orbits can be found, including 'crown', 'handlebar', 'alpha' and 'skew-alpha' - more about them later! If you wish to see a bigger St.Louis Gateway orbit, make the annulus bigger (double the 800 in Line 270 - but the program runs slower. How to speed the program a hundredfold - this is possible - is another exciting story!)

All this raises thoughts concerning globular clusters of stars that often seem regarded as fairly static, in positions away from the spiral galactic plane (a bit like flocks of gulls suspended in thermals on a summer day). But globular clusters cannot be permanently static relative to the galaxy. These orbit simulations raise questions and provide clues concerning their behaviour.

Thanks are expressed to all the very helpful staff at Sandown library.

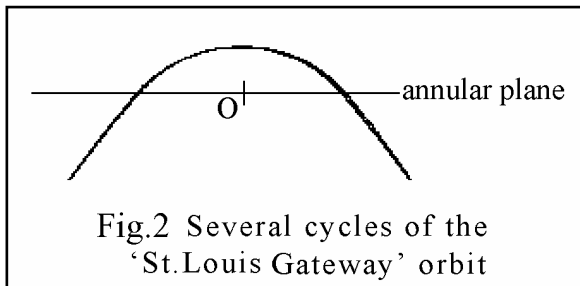
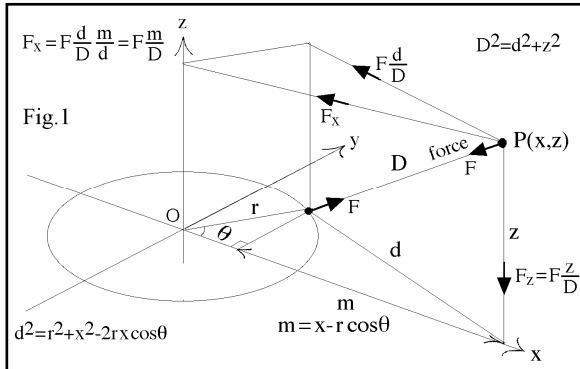
```

10 MODE 0 : dt=0.2 : clock%=0
20 REM New Zenith August 2007
30 REM THIS PROGRAM IS DEDICATED
40 REM TO THE MEMORY OF
50 REM ROBERT HOOKE
60 MOVE 200,500 : DRAW 800,500
70 MOVE 500,520 : DRAW 500,480
80 X=300: Z=0 : REM don't alter
90 PROCgravity(X,Z)
100 VELROT=SQR(Fx*X)
110 Velz=0 : X=0 : REM launch starts here
120 Z=200 : REM set launch height here
130 Velx=0.58 : REM set launch speed here
140 Velx=Velx*VELROT
150 REPEAT
160 clock%=clock%+1
170 PLOT 69, X+500, Z+500
180 PROCgravity(X,Z)
190 Zacc= -Fz : Xacc= -Fx
200 X=X+dt*Velx : Z=Z+dt*Velz
210 Velx=Velx+dt*Xacc
220 Velz=Velz+dt*Zacc
230 UNTIL clock%=10000
240 END
250 DEFPROCgravity(X,Z)
260 Fz=0 : Fx=0 : REM force components
270 FOR R%=0 TO 800 STEP 10
280 mlr%=R%+5 : REM mid-line radii
290 FOR theta%=5 TO 175 STEP 10
300 c=COSRADtheta%
```

(Continued on page 11)

(Continued from page 10)

310 $ds = m \cdot r \cdot \theta^2 + X^2 - 2 \cdot m \cdot r \cdot \theta \cdot X \cdot c$
 320 $Ds = ds + Z \cdot Z : D = \text{SQR}(Ds)$
 330 $\text{force} = 1/Ds : Fz = Fz + 2 \cdot \text{force} \cdot Z/D$
 340 $Fx = Fx + 2 \cdot \text{force} \cdot (X - (m \cdot r \cdot \theta \cdot c))/D$
 350 NEXT theta %
 360 NEXT R %
 370 ENDPROC



POSTSCRIPT to Dr Guy's article in July's NZ:

He writes: To see a correct version of Figure 2 on Page 4 of the JULY NZ, readers should rescale it as follows:

- 1 Multiply the horizontal scale by 54%.
- 2 Multiply the vertical scale by 100%

This will restore the ellipses to their proper computed shape, other ellipse eccentricities are not possible. (As shown on Page 7)

Nature Note: Guy was pleased to see myriads of glow worms alongside the cycle path between Merstone and Alverstone as he rode back home from the June 22 meeting.

NEWCHURCH PRIMARY SCHOOL ASTRONOMY DAY

Pupils at Newchurch Primary School had the chance to look through telescopes and walk around the Solar System on Monday 9th July. Members of the VAS took the 10 inch Dobsonian and the 5 inch Reflector and also a solarscope to the school, in the hope of clear skies and a chance to see the Moon. They did manage to catch glimpses of the Moon in clear patches of sky and also some were lucky enough to view the Sun. However, as it was mainly cloudy, the children looked at the Radio Station on Stenbury Down, (picture below) and were amazed at the detail that



could be seen. A scale model of the distance of the planets to the Sun was also spread out around the playing field, so everyone could see how far away from the Sun the planets (and Pluto, a dwarf planet) are.

Many thanks to those members who helped on the day.



An unusual event was seen during the morning at the school: a tornado crossing above Brading Down.

Pictures and text: Lucy Rogers

INTERESTING FACTS PART 33

According to **Bill Bryson**, the well known author and newly elected President of the Campaign to Protect Rural England (CPRE), altogether there are twenty thousand ancient parish churches in Britain. There are more listed churches than there are petrol stations. If you decided to visit one every day, it would take you 54 years to see them all. And several gallons of petrol as well, no doubt.

Caption Contest Result



*"Oh *****! I've just spent 3 grand on a new 'scope, when all I needed was this tripod to see the stars,"* says Roger Hayward according to Graham Osborne, the VAS Treasurer. Graham must be the only VAS Member who has yet to convert to teetotalism, since he was the only entrant. The bottle of wine is his. Well done.

MEMBERS AD 1

FOR SALE

Meade ETX 90 Maksutov scope & tripod. Original 26mm Plossel eyepiece & soft case. Good for planetary viewing & Moon! £250 ono.

8" Dark Star Dobsonian. V.Good mirror! (Sorry, no eyepieces for this one – I use Tele Vue and still need them!!) £200 ono.

Graham Osborne 01983 812561, or see me at Meetings.

MEMBERS AD 2

FREE TO GOOD HOME

Hilkin 60mm, f10 refractor telescope. Tatty but mechanically sound.

Optics need attention but would be OK for terrestrial viewing.

Nice alt-azimuth mount with fine control hand drives.

I can send pictures via e-mail if required.

Kevin West
01983 614591
wevinkest@tiscali.co.uk

LAST WORDS

A lazy, good-for-nothing snowball died and instead of going to Heaven, found itself in Hell.

It didn't worry too much about its future however, as its Dad had said that it would always have a chance...

Submissions to the **NEW ZENITH** are very welcome and should be sent to the the following address
The Editor **NEW ZENITH**
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Sandown PO36 0HF
Tele: 01983 407098
E Mail: johnvl@tiscali.co.uk (any attached files in Word Document format, preferably)

FIND VAS ON THE INTERNET
Members should note the Vectis Astronomical Society Website address:

<http://www.vectis-astro.org.uk>

MATERIAL FOR THE NEXT ISSUE TO BE RECEIVED BY THE 6TH OF THE MONTH
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