



South Downs Mercury



The monthly newsletter of South Downs Astronomical Society
Issue: 425 - January 2010 Editor: John Simper

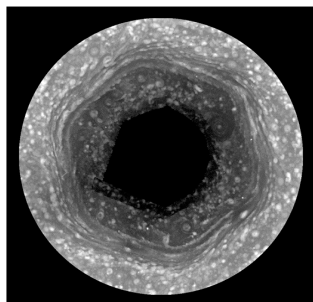
Next Meeting - Friday 8th January Main Hall of Lower School, Chichester High School, Kingsham Rd., at 7.30pm.

⊗ **Society Annual General Meeting:** Reports by the Society Trustees, Chairman, Secretary and Treasurer. Nominations for, and election of, Committee members for the coming year. Financial accounts for the Society for the last year can be found on page 2 of this newsletter.

⊗ **Main Speaker Dr Lucy Roberts: "Its ONLY Rocket Science."** Chairman of Vectis Astro Society and science writer, Lucy's talk takes its title from her book on rocket science, aimed at everyone from the wild enthusiast through to just the mildly curious.

In the News:

⊗ The Cassini spacecraft has re-imaged a six-sided cloud structure circling Saturn's North Pole. This curious structure (below) was first hinted at in images from Voyager nearly 30 years ago, and these latest images from Cassini provide evidence the hexagon-shaped jet stream is a long-lived phenomenon, similar to the Great Red Spot on Jupiter. The new images clearly show the shape of the jet stream flowing around the pole at about 77⁰ North; it is estimated to have a diameter twice that of Earth and atmospheric winds of around 220 mph.



But what causes the hexagon? Kevin Baines, an atmospheric scientist with NASA, who has studied the hexagon with Cassini's visual and infrared mapping spectrometer commented:

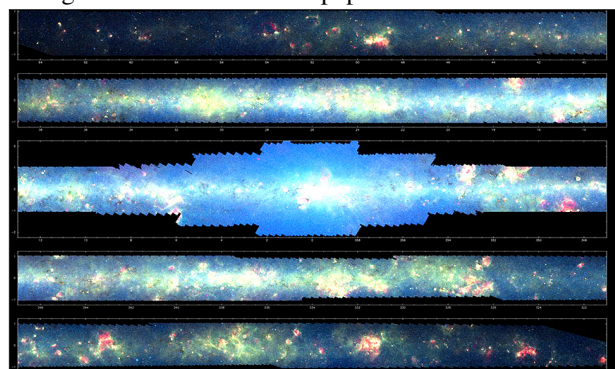
"Now that we can see undulations and circular features we can start trying to solve unanswered questions about one of the most bizarre things we've ever seen in our Solar System." For more details, go to: http://www.space.com/science/astronomy/070327_saturn_hex.html

⊗ Our edge-on view of the Milky Way gives only an indistinct band of light stretching across the sky. Now, more than 800,000 frames from NASA's Spitzer Telescope have been stitched together to create a detailed infrared portrait of dust and stars in the inner Milky Way (shown above right). To get it onto the page, we have broken the portrait into five strips; the original, on show at the Adler Planetarium in Chicago, is 120 feet long by 6 feet wide at the centre, spanning a sky region 120⁰ wide by 2⁰ deep and covering more than 50% of our Galaxy.

In our mosaic, the top strip is the area farthest to the left of the galactic centre through to the bottom strip, the area farthest to the right of the galactic centre. From Earth, the top two panels are visible from the Northern Hemisphere.

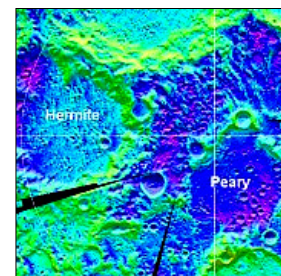
In the Spitzer portrait, the swaths of green represent organic molecules illuminated by light from stars forming nearby, and thermal emission from warm dust is rendered in red. Star-forming regions appear as swirls of red and yellow, where the warm dust overlaps with glowing organic molecules. The

blue specks sprinkled throughout the photograph are Milky Way stars. The bluish-white haze in the middle panel is starlight from the older stellar population towards the center



of the Galaxy. More information on Spitzer and the display can be found at: <http://www.spitzer.caltech.edu/Media/releases/ssc2008-11/release.shtml>

⊗ Astronomers at the American Geophysical Union meeting last fall announced that the coldest places in our Solar System are not out in the Kuiper Belt, far beyond the orbit of Neptune, but can be found much closer to home. Their analysis of measurements from the Diviner instrument aboard the NASA's LRO, measuring surface temperatures on the Moon, indicates night-time winter temperatures in the Hermite Crater at the North Pole as low as -249⁰C (only 26 degrees above absolute zero).



"The Moon has one of the most extreme thermal environments of any body in the Solar System," said Prof. David Paige, Diviner principal investigator at the University of California, Los Angeles. "During the middle of the day, temperatures can get up to about 400K (127⁰C) at the equator; and at the poles at night, they can get very cold." A very informative article can be found at: <http://www.diviner.ucla.edu/blog/>

How to Contact us:

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Or by telephone: 01483 200286

Society - by email via: www.southdownsas.org.uk

SOCIETY FINANCIAL ACCOUNTS

Financial accounts for the year 1st December 2008 to 30th November 2009, as shown below, will be presented to the Society at the January AGM.

Income		Expenditure	
Subscriptions	£1,540.00	Stationery	£219.06
Donations	£29.00	Postage	£408.05
Bank Interest	£7.02	Speakers	£175.97
Raffle	£45.00	Halls	£445.00
	-----	Internet	£84.28
	£1,621.02	SAGAS	£15.00
Excess Exp/Inc	£273.23	Insurance	£396.90
	-----	Other	£149.99
	£1,894.25		-----
			£1,894.25

Balances

	1 st Dec. 2008	30 th Nov. 2009
Current Acc.	£1,109.28	£829.03
Deposit Acc.	£2,356.41	£2,363.43

		£3,192.46
Excess Expenditure over Income		£273.23
	-----	-----
	£3,465.69	£3,465.69

Accounts prepared and signed by:
 J. Letheren, Treasurer 1 Dec 2009
 Audited and found correct and signed by:
 J.K.W.Green MBE 5 December 2009

NGC 6992: THE VEIL NEBULA

About 7,500 years ago, a star exploded in a supernova producing what we now see as the Veil Nebula, or Cygnus



Loop. At the time, the expanding cloud of matter from the star was likely as bright as a crescent Moon, remaining

visible for weeks to people living at the dawn of recorded history. Today, the supernova remnant is still visible through a small telescope directed towards the constellation of the Swan (Cygnus.) The remaining nebula is physically huge, and even though it lies about 1,400 LY distant it covers an area over five times the size of the full Moon.

Daniel Lopez assembled this image (at left) of the Veil from multiple images taken with the 2.5metre Isaac Newton telescope in the Canary Islands.

The nebula is notorious among astronomers for being difficult to observe, even though it has a relatively bright integrated magnitude of +7. However, a telescope using an OIII filter (corresponding to doubly ionised oxygen at which wavelength almost all light from the nebula is emitted), will show the nebula clearly - even using an 8-inch telescope equipped with an OIII filter, one should be able to relatively easily see the delicate lacework apparent in photographs taken by much larger telescopes.

PRACTICAL ASTRONOMY

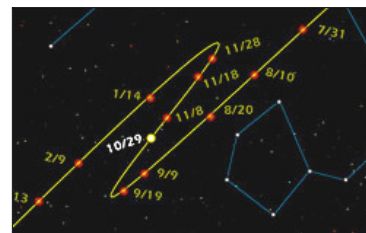
Every 26 months Mars appears to briefly halt and reverse its "normal" eastwards motion against the background stars. The current retrograde movement started late last month, on 20th December, when Mars was in Leo, and occurs as the Earth in its smaller, faster orbit catches up with and then overtakes Mars in its larger, slower orbit around the Sun.

On 10th March this year, after appearing to move about 19^o westwards, Mars will again reverse direction, getting back to its December point in Leo by 17th May. The average weekly movement will be about 1½^o.

An interesting piece of practical observing is to measure and plot the position of the planet each week during its retrograde and (from March) direct motion across the sky. It isn't necessary to determine the Right Ascension, or "absolute" position of Mars in the sky - instead, measure only the angular difference between the position of the planet and a nearby reference star.

Slightly more difficult, the altitude of the planet should also be measured - again, this can be referenced as an angular difference in altitude to your reference star.

Plotting your results will show the planet describing a loop or "ess" against the background stars; examples of the motion in 2003 (upper) and 2005 (lower) are shown here.



Which of the two types of retrograde motion occurs depends upon where Mars is, relative to the nodes of its orbit (the directions, as seen from the Sun, where the plane of the planet's orbit crosses the plane of our orbit). If Mars is near a node, heading either upward or downward, an "ess" shape is produced. If it is near

the top or bottom of its orbital motion (heading up and then downward or down and then upward), a loop is produced.

ASTRONOMY AT THE U3A

Or, never volunteer unless forced to do so!

(Contributed by Michael Pharo)

A few weeks after I had rather reluctantly joined the University of the Third Age (U3A), my interest was awakened by a questionnaire which asked, amongst other things, 'are you interested in Astronomy?' and 'if you are, would you be prepared to facilitate (i.e. offer your house) for the meetings?' I ticked both these boxes as my interest was considerable but my knowledge wasn't and I saw this as a wonderful opportunity to learn more.

The U3A Secretary thanked me for my offer and it was arranged that a meeting would be held, in our house. A suitable date was fixed and, sure enough, Margaret the Secretary and five other people arrived. After introductions they all sat around looking at me and I then realised that 'facilitate' meant a bit more than I had understood!

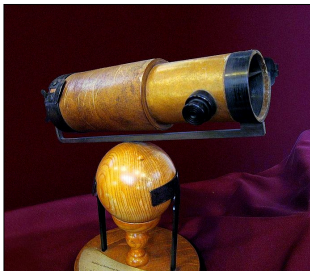
At that first meeting Les, one of our group, persisted in asking questions about the Big Bang and where did it all come from and where would it end? I had no answers other than to sit him elsewhere in our sitting room so I could talk about the planets.

I realised that at future meetings I would have to be much

A JANUARY ANNIVERSARY

Isaac Newton was born at Woolsthorpe Manor in Lincolnshire on 4th January 1643; his birth date is also recorded as Christmas Day, 25th December 1642 under the old style Julian calendar then in use. Various described as a Physicist, Mathematician, Astronomer, Natural Philosopher and Theologian, he is considered to be one of the most influential men in history.

Against the wishes of his mother who wanted him to become a farmer, the young Newton, age 17, was encouraged by a Kings College school master to complete his education at Trinity College, Cambridge, where he gained a degree, and was employed there as a Fellow from 1667. His early prowess in Mathematics led him to the development of a generalized Binomial theorem and, with Leibnitz, to share the credit for developing the foundations of what was to become known as infinitesimal calculus, one of the greatest mathematical tools ever devised.



From age 27 he studied and lectured on Optics, demonstrating the refraction of light by a prism and concluding that the use of a lens in a telescope would inherently produce a colour dispersion, now known as chromatic dispersion. To overcome this effect he used a mirror as the objective instead of a lens, presenting the Royal Society with the first effective Reflecting Telescope in 1672 (pictured above.)

His 1687 publication of the *Philosophiæ Naturalis Principia Mathematica* (usually called the *Principia*) is considered to be

more prepared and so I delved into books, magazines and searched the internet. My quest for greater knowledge was being satisfied but not quite in the way I had imagined.

As a break from my researches I arranged various jaunts for the group. We have been to Intech at Winchester, visited the Chichester planetarium and the Clanfield observatory, and been lectured to by Dr. John Coleman about the workings of the Large Hadron Collider at CERN in Geneva, with which he had been involved. We have also had the occasional 'star' party when we have looked at planets through my 6" reflector.

Two years on, 'my' little group has grown to 10 and we are happy to discuss just about anything pertaining to astronomy. So much so that I suspect we could give Einstein a run for his money. Even a question about the string theory in 10 dimensions is no problem at all – we KNOW how long a piece of string is!

In our search for more information, if anyone reading this would like to come and talk to us on anything astronomical we would be delighted to welcome you. Please, please ring Michael on 02392 345411.

A Happy New Year to all members of the Society and see you at the next meeting on 8th January!

among the most influential books in the history of science. In this work, Newton described universal gravitation and the three laws of motion that dominated the scientific view of the physical Universe for the next three centuries. By demonstrating the consistency between Kepler's Laws of Planetary Motion and his own Theory of Gravitation Newton showed that the motion of the celestial bodies and objects on Earth are all governed by the same set of natural laws.

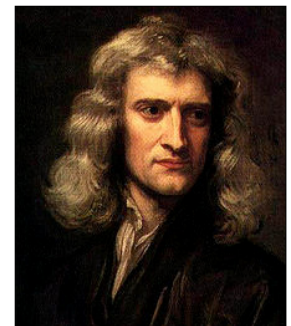
English poet Alexander Pope was moved by Newton's accomplishments to write the famous epitaph: *Nature and nature's laws lay hid in night;*

God said "Let Newton be" and all was light. Newton himself was rather more modest of his own achievements, famously writing in a letter to Robert Hooke in February 1676: *If I have seen further it is by standing on the shoulders of Giants.*

In a later memoir, Newton wrote of himself: *I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.*

Newton (pictured above at age 47) remains influential to this day, as demonstrated by a Royal Society 2005 survey of scientists and the public which deemed he had made a greater contribution to science than even Albert Einstein.

Newton died in his sleep in London on 31st March 1727 and was buried in Westminster Abbey.



January 2010 Sky Diary:

Chart for Chichester, mid-month, 9.00 p.m.

(Compiled by Peter Littlejohns)

Mercury: will appear low in the southeast towards the end of the month, rising just before dawn and brightening to mag.-0.1.

Venus: too close to the Sun to be visible.

Earth: daylight hours slowly starting to increase after last month's solstice.

Mars: visible all night as the planet moves towards Praesepe (M44) in Cancer. It will be at opposition on the 29th. It will then be at its maximum magnitude of almost -1.3, at a distance of 61.8 million miles from Earth.

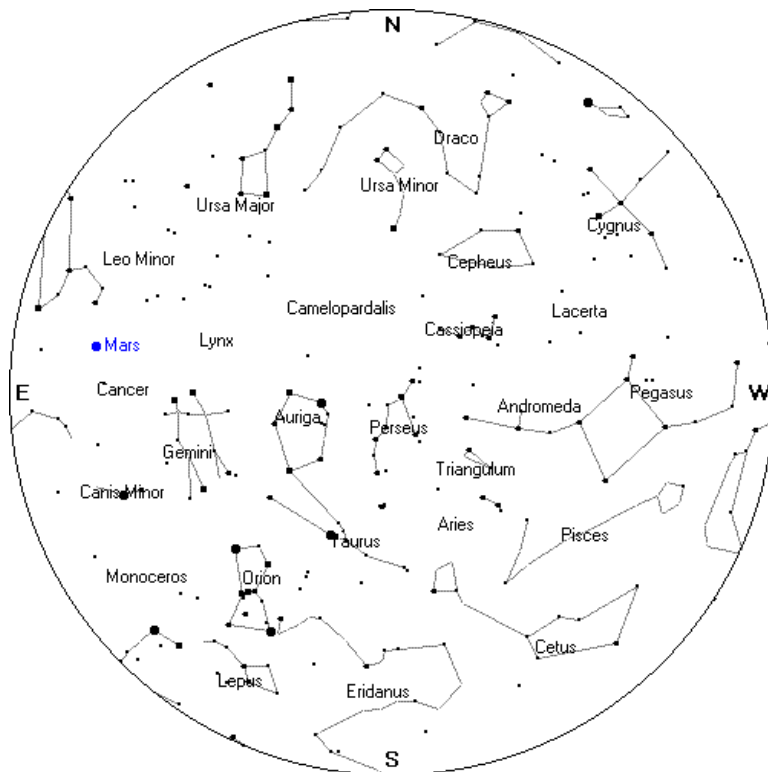
Jupiter: at mag.-2.1, this will be the last time to see the planet for several months. The Moon will appear close by on the 17th and 18th.

Saturn: rises around 22:30. Still presenting very narrow rings and shining at mag.0.8.

Uranus: sets around 21:45 but at mag.+5.9 needs good eyesight or a small telescope.

Neptune: very close to Jupiter at beginning of month, but becoming lost in the evening twilight by the end of the month. At mag.8.0 needs a telescope to be observable.

Meteors: The Quarantid shower occurs on the 3rd, comprising debris from Comet 2003EH1. The constellation that gives its name to this shower no longer exists, but the radiant can be found in the northeast, between Draco (the pan-handle of Ursa Major) and Bootes.



Last Month's (December) Meeting:

In his talk **Michael Faraday and the Liquid Nitrogen Show**, Peter Ford talked us through the scientific career of this great British experimenter, as well as treating us to an entertaining demonstration of some of the liquefied gas and electromagnetic phenomena Faraday investigated.

After attending some Humphry Davy lectures at the Royal Institution, at age 21 Faraday applied to be Davy's assistant;



a year later, he was appointed as a chemical assistant. Over the next decade he investigated the effects of rotating conducting coils in magnetic fields, the basis of the electric motor, publishing his work in 1821.

Less well-known, Faraday made extensive investigations

into the liquefaction of gases, succeeding in producing liquefied chlorine in 1823 by pressurising chlorine gas inside a curved glass tube that was submerged at one end in a beaker of crushed ice. Under pressure, the gas changed into

liquid chlorine when cooled by the ice near the end of the tube. Faraday also liquefied carbon dioxide, hydrogen sulfide, and hydrogen bromide in a similar manner.

In 1826, he founded the Royal Institution's Friday Evening Discourses and in the same year the Christmas Lectures, both of which continue to this day.

Peter's demonstration of Faraday's discovery of how an electric current was generated by rotating a coil in a magnetic field was based on the same simple apparatus that Faraday used. Demonstrating that the current was related to the rate of flow of electrons in the coil, immersion of a small battery into a flask of liquid nitrogen caused the flow to reduce and a small bulb gradually dimmed and finally extinguished. Removing the battery from the flask and the bulb slowly re-illuminated.

Peter suggested that his final experiment shouldn't be tried at home! Adding a few drops of washing-up liquid to a tray of liquid nitrogen produced a wonderful flow of soap bubbles, overflowing the tray and gradually spreading across the floor, much to the delight of the youngsters in the audience.

Many thanks Peter for a most interesting demonstration of some of the achievements of this great British scientist.

Planetarium Shows in January:

Fri. 1st 7:30 p.m. The Mid-Winter Moon
 Sun. 3rd 3:30 p.m. The Stars This Month
 Fri. 8th 7:30 p.m. Halley: Most Famous Comet of All
 Fri. 22nd 7:30 p.m. The Stars this Month
 Sun 24th 3:30 p.m. Hubble's Glorious Universe

Fri. 29th 7:30 p.m. Halley: Most Famous Comet of All
 Sun. 31st 3:30 p.m. The Stars this Month

Do remember! SDAS Members can watch planetarium shows at the special, discounted, ticket price of only £5.

Booking by Telephone: 01243 774 400 or 07818 297 292