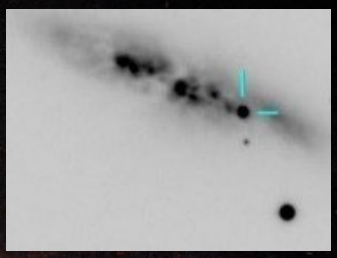
SAS NEWS

Sunderland Astronomical Society

In this issue: Darke Skies + NASA's *SpacePlace* + More *Controversies in Transactions* with *Old Boots*



BANG!

A new supernova lights up M82

February 2014

www.sunderlandastro.com **Registered Charity #1071527**

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Events list

☼ **The Cygnus Observatory** is open for the public 7pm – 9pm, **every Thursday** (weather permitting). All members welcome.
☼ **Workshop meetings** are held at 7pm on the **second Sunday** of every month

Wed 05 February: SAS visits East Herrington Primary Academy
Saturday 08 Feb: **Jupiter Night** – at Nissan sports & leisure complex, 6pm onwards
Friday 14 Feb: Full Moon
Sunday 16 Feb: Lecture meeting: SAS member **Natalie Lowes,** on the subject of **"Globular Clusters"**
Wed 26 Feb – Sun 2 March: Kielder Star Camp

Saturday 01 March: New Moon; **National Astronomy Week** begins
Saturday 08 Mar: ISAN7 (International Sidewalk Astronomy Night)
Sunday 16 March: Lecture: Oxford Uni astronomer & BBC Sky at Night presenter **Dr Chris Lintott, "Galactic Archaeology"**
Sunday 30 March: New Moon

+++ See website for more information and updates +++
http://www.sunderlandastro.com/

All Society events
- are free,
- are held in the Washington WWT facilities, and
- evening meetings start at 7:00pm

unless otherwise noted.

Please bring a torch and warm clothing to any night-time observing sessions. All observing sessions are dependent upon favourable weather and **may be subject to cancellation**.

Editorial

Dear Members,

Happy New Year! And what a year it's been so far – I feel like we've never stopped. It's becoming traditional for the new year to start with some BBC Stargazing Live activities and this year the Society held two very successful Jupiter Nights on the 10th and 11th January. It looks as though we had about 650 members of the public visit the observatory that weekend, so a big "Well Done" to everyone from the Society who helped out and a big "Welcome" to the new members who have since joined us.

Don't forget there is also a third Jupiter Night being held at **Nissan** Sports and Leisure **on 8th February**. It should be a big turn out, so all help and support at this event very much appreciated.

On the 20th January Harry Herron, Paula and myself were at the **Rosetta Space Night** at the Centre for Life in Newcastle, advertising the SAS. The night was themed around the Rosetta mission to Comet 67P, which was restored from hibernation on 20th January to begin its main mission of intercepting the comet. The more I think about this mission, the more excited I get. It's a logical successor to the Giotto mission in 1986 when a probe intercepted Halley's comet, giving us out first ever glimpse of a comet's nucleus. I still remember the Giotto flyby well, watching it on a black and white portable television. (Those were the days!)

On a sadder note, we acknowledge the passing of two great astronomers: **Halton Arp** (1927 – 28 Dec 2013) and **John Dobson** (1915 – 15 Jan 2014). While Arp's name will be familiar mostly to those interested in galaxies, Dobson had a huge influence on amateur astronomy. The can be few of us who haven't seen, looked through, owned or possibly built a "Dobsonian telescope." Dobson also championed the idea of Sidewalk Astronomy; **International Sidewalk Astronomy Night** will be held on 8 March in his honour. You may have seen Matthew and myself on Look North doing some pavement astronomy in Newcastle. It's good fun, and weather permitting, we'll try and do some more for John Dobson on the 8th March.

Don't forget that on 16 March, we welcome celecbrity astro **Dr Chris Lintott** to the SAS. That's sure to be a popular talk, so get there early for a space up front in the mosh pit!

I'll hope to see you soon at one of our events - **Dave N, Editor.**

The most volcanically active place is out-of-this-world!

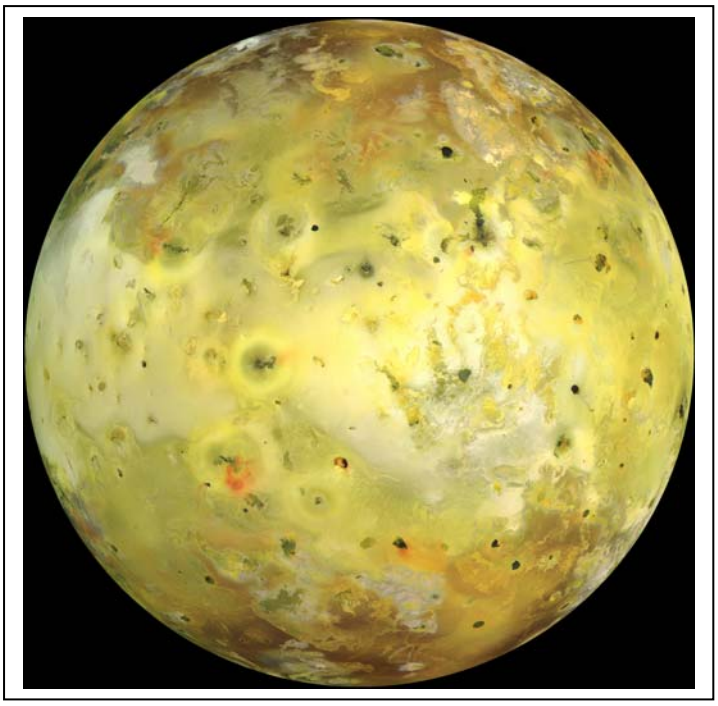
By Dr. Ethan Siegel

Volcanoes are some of the most powerful and destructive natural phenomena, yet they're a vital part of shaping the planetary landscape of worlds small and large. Here on Earth, the largest of the rocky bodies in our Solar System, there's a tremendous source of heat coming from our planet's interior, from a mix of gravitational contraction and heavy, radioactive elements decaying. Our planet consistently outputs a tremendous amount of energy from this process, nearly three times the global power production from all sources of fuel. Because the surface-area-to-mass ratio of our planet (like all large rocky worlds) is small, that energy has a hard time escaping, building-up and releasing sporadically in catastrophic events: volcanoes and earthquakes!

Yet volcanoes occur on worlds that you might never expect, like the tiny moon Io, orbiting Jupiter. With just 1.5% the mass of Earth despite being more than one quarter of the Earth's diameter, Io seems like an unlikely candidate for volcanoes, as 4.5 billion years is more than enough time for it to have cooled and become stable. Yet Io is anything but stable, as an abundance of volcanic eruptions were predicted before we ever got a chance to view it up close. When the Voyager 1 spacecraft visited, it found no impact craters on Io, but instead hundreds of volcanic calderas, including actual eruptions with plumes 300 kilometres high! Subsequently, Voyager 2, Galileo, and a myriad of telescope observations found that these eruptions change rapidly on Io's surface.

Where does the energy for all this come from? From the combined tidal forces exerted by Jupiter and the outer Jovian moons. On Earth, the gravity from the Sun and Moon causes the ocean tides to raise-and-lower by one-to-two meters, on average, far too small to cause any heating. Io has no oceans, yet the tidal forces acting on it cause the world itself to stretch and bend by an astonishing **100 meters** at a time! This causes not only cracking and fissures, but also heats up the interior of the planet, the same way that rapidly bending a piece of metal back-and-forth causes it to heat up internally. When a path to the surface opens up, that internal heat escapes through quiescent lava flows and catastrophic volcanic eruptions! The hottest spots on Io's surface reach 1,200 °C (2,000 °F); compared to the average surface temperature of 110 Kelvin (-163 °C / -261 °F), Io is home to the most extreme temperature differences from location-to-location outside of the Sun.

Just by orbiting where it does, Io gets distorted, heats up, and erupts, making it the most volcanically active world in the entire Solar System! Other moons around gas giants have spectacular eruptions, too (like Enceladus around Saturn), but no world has its surface shaped by volcanic activity quite like Jupiter's innermost moon, Io!



Learn more about Galileo's mission to Jupiter: http://solarsystem.nasa.gov/galileo/.

Kids can explore the many volcanoes of our solar system using the Space Place's Space Volcano Explorer: http://spaceplace.nasa.gov/volcanoes.

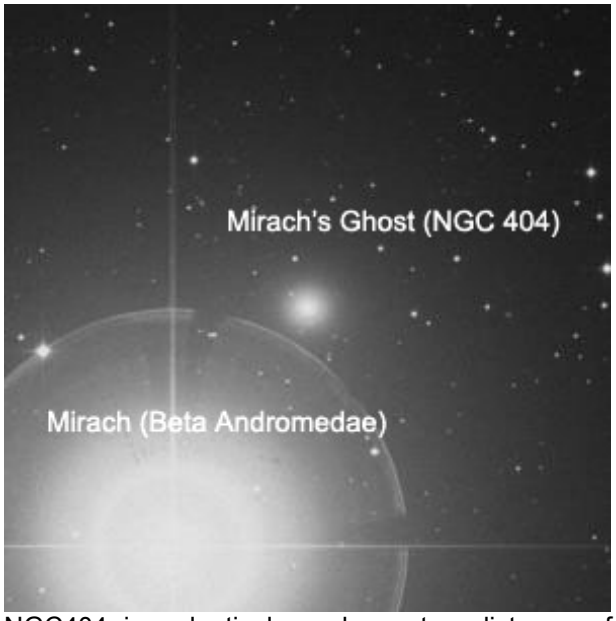
Left: Jupiter's moon *Io.*

Image credit: NASA / JPL-Caltech, via the Galileo spacecraft.

Autumn Wonders

The constellation of Andromeda rides high during early evening at the moment. Although it's most famous for M31, try hunting for a few of its less well known objects:

NGC404 is a galaxy located very close to the bright star Mirach. Indeed this galaxy's nickname is the "Ghost of Mirach" due to its apparent ability to blink in and out of vision when an observer switches between looking directly at Mirach and then away from it. It is weird how the ghostly elongated smudge that is NGC404 seems to drift in and out of view. It's actually quite a bright galaxy at magnitude 11 but the proximity of Mirach makes it seem much fainter.



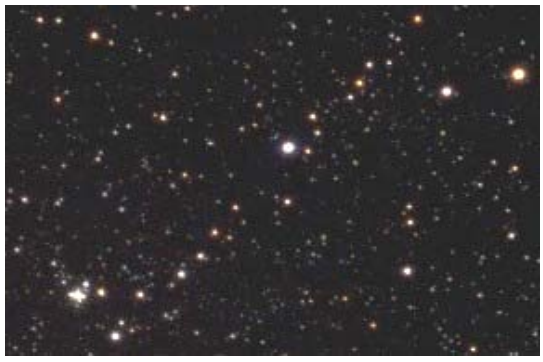
NGC404 is a lenticular galaxy at a distance of around 10 million light year away. Lenticular galaxies are odd. The name means "lens shaped" which they are. They are class of galaxy in between ellipticals and spirals. They have the rough shape of spirals but without spiral arms.

Also in Andromeda is the Blue Snowball, a planetary nebula. The catalogue number for this object is NGC7662. This object is extremely bright and is easy to see even from heavily light polluted locations. It is however quite small and does require a reasonable amount of magnification to reveal it as anything other than a bloated star.

To find it without the use of a goto system requires some patience as it's not near any bright stars. The closest star of any note is the fourth magnitude Lambda Andromeda. From there you need to head towards Scheat, the upper right star in the Square of Pegasus - about one fifth of the way. Look out for a star with a fuzzy looking edge, centre it up and switch to higher magnification. The blue colour is quite prominent.

Our next target is another of my double stars. This time the star Almaak in Andromeda, which looks very similar to the celebrated double Albireo in Cygnus. Almaak also has two strongly coloured components of blue and gold, but it's a tighter double than Albireo and you'll need slightly higher magnification to split it. Try something around 80x. Almaak is 393 light years away.

Next up we move across into the constellation of Camelopardalis, the Giraffe to spot an object that requires very low power and a wide field – Kemble's Cascade. Binoculars are ideal for this one. The cascade is a string of magnitude 7 to 8 stars running down towards the open cluster NCG1502. The cluster and the stars of the cascade are unrelated but this chance alignment gives a rewarding spectacle. It's almost like a cascade of water with the cluster being the splash-pool at the bottom. It's a very pretty object and can be found by sweeping with binoculars eastwards from the W of Cassiopeia about the same diameter of the W asterism. It would make a great target for imagers with telephoto lenses or short focal length telescopes.



Back soon with more obscure gems from the observing memory banks!

Graham

Some Old Controversies in Transactions

With "*Old Boots*"

{An old and esteemed correspondent continues his reminiscences of the controversies which raged in the earlier numbers of this journal.}

"*Cannibals prefer those who have no spines.*" - Stanislaw Lem

Sound Advice

Volume 5 opened with a note by *Sigma* on New Zealanders and South Sea Islanders and an attack on vegetarians, viz;
"Have you never appreciated a beef steak and large glass of Porter in comparison to a cheery bowl of gruel? We know that the New Zealanders and South Sea Islanders are inveterate cannibals. They are none the less a very fine race of men who in the past had no other form of meat to eat. When Captain Cook introduced the pig to these colonies he had done more good than the work of all the missionaries put together."
He went on: "The terrible ferocity of these vegetarians is a psychological study in itself."

That rattled the irons in the fire. '*Black Magic*' replied by saying that; "Since my good wife and I dined at 'The Stumble Inn', Fleet Street, and suffered poisoning by steak tartar, we have never ingested that vulgar substance since. We were both in bed for over a week with the most awful headache and inflamed limbs; indeed I had to contact the doctor by telegram which cost me one shilling as it was after 9:00 pm. After examination the doctor informed me that the symptoms could only be described as 'clenched hair syndrome' and had never witnessed the condition before.
"My friends have since informed me that it may have been the 'tartar', but I disagree. A good tartar never hurt anyone."

Alongside this subject ran a column concerning '*patents*' and one correspondent must have misread the word for he went off on the wrong tack thinking there was a reference between 'parents' and 'cannibalism'. He wrote,
"Sir, I find your reference to cannibalism and my parents most insulting. Granted, if my brothers or I did wrong then we were told so and ordered to spend time in the airing cupboard as punishment. But not once Sir, not once, did my Mother or Father ever try to make a meal out of us. My Mother often scorned my Father for "making a meal out of things," etc.; but that was in reference to her asking him to do menial tasks around the house; not for making a meal out of my brothers or I."

The issue of parents and patents rumbled on for a considerable time and at times the two became so entwined that readers were lost in a maelstrom of accusations.

The *value* of parents and patents generated the most controversy. On page 341, *'Scientific Opinion'* hoisted his banner and stated,
"…he holds that no inventor has the absolute right to the exclusive use of his own inventions. Most certainly he has not. Nor, may I add, to anything else, except what he can get, and keep. Absolute rights are mere myths. However, a patent on your parents and their relationship with Tartars in Fleet Street is another matter."

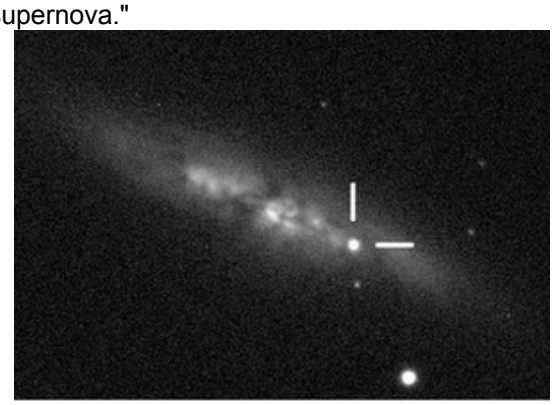
{*To be continued…*}

New Supernova discovered in M82

An exploding star has been spotted in the night sky - the closest supernova to Earth that has been seen in decades.
The dramatic event happened 12 million light years away in Messier 82 - known as the cigar galaxy for its shape. It was discovered on 21 January by undergraduates during a telescope class at the University of London Observatory.
"One minute we're eating pizza then five minutes later we've helped to discover a supernova. I couldn't believe it," said student Tom Wright. "It reminds me why I got interested in astronomy in the first place."

Continued over

The students from University College London were taking part in a 10-minute lesson with astronomer Dr Steve Fossey when they noticed what appeared to be a "new star".
"We pointed the telescope at Messier 82 - it's quite a bright galaxy, quite photogenic. But as soon as it came up on screen, it didn't look right to me," Dr Fossey told BBC News.
"We fired up another telescope, we got another frame - and that was when we knew it was a supernova."



The "fluke" discovery led to a global scramble to acquire confirming images and spectra from the dazzling object.
It now been confirmed by the International Astronomical Union as a supernova - a violent blast of energy and light that is hurled out as a star dies.
It has taken 12 million years for the light to reach us. But though this may seem light a long way away, scientists say this is the closest supernova to be spotted since the late 1980s.
Scientists says it could grow even brighter over the coming weeks.
Astronomers in the northern hemisphere may be able to spot it with binoculars, by looking between the Great Bear and the Little Bear.
After that it will fade away, vanishing forever - leaving behind a dense, fast spinning neutron star.

[Source - BBC News]

Rosetta spacecraft wakes up

Rosetta, Europe's comet-chasing spacecraft, has woken from its slumber.

A signal confirming its alert status was received by controllers in Darmstadt, Germany, at 18:17 GMT on 20th January. Rosetta has spent the past 31 months in hibernation to conserve power as it arced beyond the orbit of Jupiter on a path that should take it to Comet 67P/Churyumov-Gerasimenko in August.
Engineers will now finesse the probe's trajectory and prepare its instruments for the daring encounter.
One of the highlights of the mission will be the attempt to put a small robotic lander, Philae, on the surface of the 4.5km-wide comet. This will occur in November.

There were nail-biting moments in the Darmstadt control room as its flight engineers waited for the signal to come through. Three quarters of the way through the hour-long window of opportunity, they got what they were waiting for.
Monday's message, when it arrived, was a simple one - just a spike on the screens at the European Space Agency's operations centre. The signal contained no spacecraft telemetry, but its mere receipt from 800 million km away confirmed to controllers that Rosetta's automated systems were operating as expected.
It was picked up in California by a 70m dish belonging to the US space agency, and then routed to Germany.
Rosetta was put into hibernation in June 2011 because its trajectory through the Solar System was about to take it so far from the Sun that its solar panels would harvest minimal energy. The decision was therefore taken to put the spacecraft in a deep sleep. Now that it is arcing back towards the Sun, more power is becoming available to operate the probe.
Launched back in 2004, Rosetta has taken a rather circuitous route out to its target.
This has involved making a number of flybys of the inner planets, using their gravity to pick up sufficient speed for the eventual encounter.
It has already delivered some fascinating science, particularly from the close passes it made to two asteroids - the rocks Steins, in 2008, and Lutetia, in 2010.

The plan is for Rosetta to escort the comet as it moves closer towards the Sun, monitoring the changes that take place on the body. The Philae lander will report changes that occur at the surface.
Comets - giant "dirty snowballs", as some have called them - are believed to contain materials that have remained largely unchanged since the formation of the Solar System 4.6bn years ago.
"We will sample the physical and chemical composition of the comet," said Matt Taylor, Esa's Rosetta project scientist. "This will give us knowledge on how and where the comet was formed, and about its subsequent journey through the evolution of the Solar System.
"We can connect that as well to the formation of the planets themselves. And, in addition, the elemental make-up of the comet can be considered 'star stuff' - it will provide us knowledge of the formation processes within the Sun itself."

[Source - BBC News]

An Introduction to Stargazing & Astronomy

Jupiter Nights

You are part of an amazing Universe.
Want to know more...

- Suitable for all ages.
- Inflatable planetariums available.
- Interactive presentations with Q&A.
- Expertise and advice from local astronomers.
- Videos and Demonstrations.
- Craft area for children.
- Hot food and drinks stalls.

Jupiter Nights Event , Feb 2013 - feedback:
"What a great night at Nissan Sports & Leisure Complex tonight, Thanks to all the organizers, it really was a very well run event".

Join local astronomers for a fun night of assorted astronomical treats!

Powerful telescopes will be available to unveil the Moon, the mighty planet Jupiter and its four largest moons.

See the amazing stellar nursery, the Orion Nebula (M42).

See a gorgeous star clusters such as "The Seven Sisters" and "The Beehive" clusters.

Plus many other wonders of the night sky.

Note: Bring a small torch along & convert it to an astro-friendly red torch in the craft area.

Nissan Sports & Leisure Complex

Box Office: 0191 4152354

www.nissansportsandleisure.co.uk

Ticket Price: £6

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6:00 pm
till
10:00 pm

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Comes with the following accessories:

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- Clavé (Paris) 1.25inch eyepieces in these focal lengths: 5mm, 6mm, 8mm, 10mm, 12mm, 16mm, 20mm, 25mm, 35mm and 2x barlow;
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- Unbranded 9mm Orthoscopic, 15mm Kellner and 25mm Plössl;
- Celestron 2x barlow and corner corrector.

Filters:

- Meade set of 12 colour filters; plus
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All enquiries and sensible offers please to
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