The Messenger
Mexborough & Swinton Astronomical Society
April 2016

The Novaya Zemlya Effect

Dutch navigator Willem Barents was on an expedition to find a trade route through the Arctic Circle in 1597. His ship and crew were iced in and had to spend the winter on a small island.
On November 3 they saw the sun for the last time as it set below the horizon. They didn't expect to see the sun again until February 8.
On January 24, 1597, three of the crew caught a glimpse of the sun a good two weeks before its predicted return. Captain Barents did not believe them since he knew that the sun was well below the horizon. Three days later, the sun made another appearance, and Barents himself witnessed it along with many crew members. Once the explorers returned to the Netherlands, Gerrit de Veer, one of the crew, published an account of their observation. Barents, unfortunately, had died during the return journey. At least the Barents Sea was named after him.
News of the Novaya Zemlya observation spread with incredible rapidity through the scientific community. In his treatise on optics (1604) Kepler wrote that "everyone has heard of the adventures of the Batavians in the Arctic". His book includes a surprisingly good attempt at explaining it.
Most scientists of the day did not believe the accounts of the unusual sunrises, though. It took several other observations, hundreds of years apart, for the Novaya Zemlya Effect to be believed, and eventually, understood. It has to do with temperature inversions and light bending



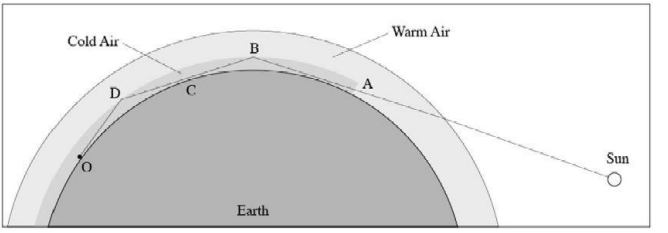
Ernest Shackleton observed it in Antarctica during his 1914-17 expedition that ended with one of the world's greatest sea voyages to South Georgia.
The first basically correct optical explanation of the NZ effect must probably be attributed to Baills, who in 1875 wrote



Whitefish Summit, 20 km from the camera

"Would this not rather be a phenomenon of total reflection, in complete analogy, theoretically speaking, to the formation of a rainbow, where here the whole Earth plays the same role as a single water droplet? The total reflection zone would roughly be determined by the separation of the upper part of the atmosphere which is constantly heated by the Sun as opposed to the lower part, which is only heated in summer. "

So light can travel long distances around the curve of the Earth is by repeated returns from an inversion layer. The atmosphere behaves as a light pipe. The process is called optical ducting.
In a similar fashion mirages of artic islands on or over the horizon can be seen across the frozen sea.



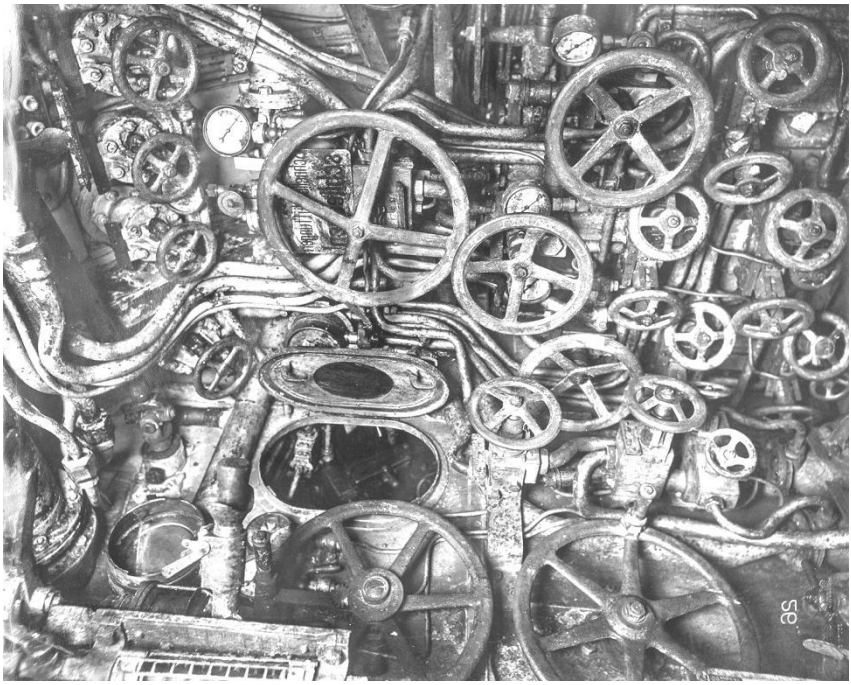
Night Sky in April

The Moon - The Moon becomes "New" on the 7th, Full Moon is on the 22nd April
Mercury is at greatest eastern elongation on 18th April, but is low on the horizon only some 13° high at sunset. You should be able to get the mag -2.2 planet if clear skies permit. It will set some 2 hours after the sun at about 10:15pm,
Mars is getting better all the time for observations and will reach opposition next month, however it will get no better than 15° above the southern horizon. It rises at 12:45am on the 1st April, and 11pm on the 30th...
Jupiter is now past opposition but is still a brilliant object in the evening sky and is still visible for the whole night throughout the month.
Saturn like Mars will be low in the sky even when at its highest southern point in the sky – only some 15° above horizon. On 1st April it will rise at 1:30am and on 30tht April at 11:30pm
There will be a conjunction between the Moon and Jupiter on the 18th April – with a separation of some 2° at about 4:30am.
The Lyrid meteor shower reaches its peak on 23rd April, however with a predicted maximum of 10 per hour and the moon close to being full – don't expect too much!

And there was I digging this hole, hole in the ground, it was flat at the bottom and the sides were steep……,



Work being done to check on the viability of installing a septic tank at the observatory as part of Project Aquarius.



The New Focuser has now been fitted as shown above. Note it is important the odd numbered controls are only turned anti-clockwise on Tuesdays. The 49,800 page manual is available for loan from the society library but unfortunately is only in Braille.

Solstice Dinner

We are now after your money and your menu decision for this years event which is to be held on Friday June 17th at the Rockingham Arms, Wentworth.
Total cost will be £25 per head
Note: No extra charge for Non-Members, wives, children, siblings and others

FRIDAY JUNE 17th 2016 **ROCKINGHAM ARMS – Wentworth 7pm**

Menu

STARTER	MAIN	PUDS
Whitebait	Half Roast Chicken	Chocolate Fudge Cake
Stilton Mushrooms (V)	Roast Beef Topside	Ice Cream Sundae
Soup of the Day	Roast Pork	Apple & Blackberry Crumble
	Halloumi & Chips	

Keynote Speaker – Alan Chapman

Sheffield Hallam Professorial Lecture

"Milestones and Millstones; a Random Walk through Polymer Science"

Professor Chris Sammon

Wednesday 27 April 2016
6 for 6.30pm
210, Norfolk Building,
City Campus, Sheffield Hallam University

About the lecture

So how does a vibrational spectroscopist become a Professor of Polymer Science? Hang on, what is a vibrational spectroscopist? And whilst we're at it, what is a Professor of Polymer Science? In this lecture I will give a potted history of my research career introducing important people, projects and places and showing how they influenced my development. Along the way I'll discuss drinks bottles, tablets, silicone coatings, water, hydrogels, tissue sections and micro particles. I'll also get around to describing what a vibrational spectroscopist is, what a Professor of Polymer Science is and explain how I evolved from one to the other.

Places are free and include light refreshments, but must be booked in advance.
Refreshments served from 18:00-18:30. The lecture will begin at 18:30 prompt.

Book now
https://www.eventbrite.co.uk/e/professorial-lecture-professor-chris-sammon-tickets-21554417844

BAA Summer Meeting

Venue: Priory Street Centre, 15 Priory Street, York, YO1 6ET (click to see map)
Date: Saturday, 2016, July 2 - 10:00 to 18:00

The programme line up is: -

Dr Simon Dye, Nottingham*: Weighing Galaxies and Clusters 'using gravitational lensing'*
Prof. Sean Paling: *Deep Underground Science at Boulby Mine: The Search for Dark Matter & Beyond…*
Dr Rita Tojeiro, St Andrews: *'Mapping the Universe: from bright stars to dark energy'*
Dr Giles Hammond, Glasgow*: Advanced LIGO & Gravitational Wave Astronomy*
Mr Harley Katz, Cambridge: *Galaxy Formation and Evolution - Theory vs. Observation*

Booking information
Booking for this meeting is essential, as we have a limited number of places available. To book your place, you can either:
Book a place through the BAA online shop. Fill out our booking form and return it to the BAA office by post.
Contact the BAA office on 0207 734 4145 (staffed 9am to 5pm, Mon-Fri).

Closing date for bookings is 20th June 2016

Several well-known retailers will also have stands, including: -
BAA Sales, Peak 2 Valley Instruments, The Widescreen Centre, Grover's Optics Shop.

Hovenweep Towers

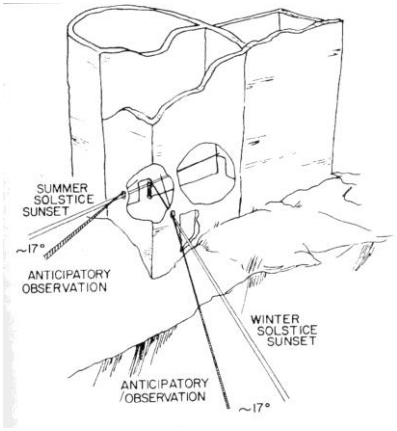
You might think at first glance that the Hovenweep towers are the remains of an early Norman or Anglo=Saxon castle, but you would be wrong.



Hovenweep was surprisingly built by the North American Puebloan Indians in Southwestern Colorado. The area shows inhabitation going back to at least 8,000BC. Small communities started being built up and extensive pottery remains from about 500AD have been found. A community of perhaps 2-3,000 people lived along the tops of the canyons, with extensive farming and brick buildings.

It has been determined that the towers that form “Hovenweep Castle were built between 1000 and 1200AD – a time frame similar to when castle were being built in England. It is thought that the area was left deserted around 1350AD – probably due to drought.

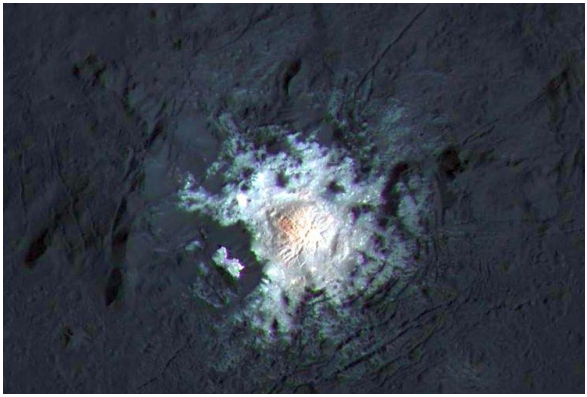
The slots and doors of Hovenweep Castle, in Square Tower Group, have been shown to define an apparent solar calendar. The building is aligned so that light is channelled through openings into the building at sunset of the summer solstice, the winter solstice and the spring and fall equinox. The light falls in a predictable pattern on interior door lintels. Tree-ring dating of timbers used in the construction of the 'Sun Room' suggests that it was added in 1277 AD about 100 years after the main structure, called the Castle, was completed. Two ports, or windows, in the large tower admit the rays from the sun into the interior room, and it has been proposed that this arrangement was used as a solar calendar. The equinox port points to the sunrise azimuth 4 days after the vernal equinox. One explanation for this is that this is the consequence of a method for establishing the equinox azimuth by counting and halving the number of days between the winter and summer solstices.





The Salty Spot of Ceres

The Dawn mission to Ceres has descended into a low orbit less than 400km from the surface of the asteroid.
It has finally been able to take detailed images and measurements of the “bright spots” in the crater named Occator.
The bright deposits seem to be salts left behind from evaporating water coming up from the interior of Ceres through what appear to be cracks and clefts in the central peak of the crater giving rise to the most prominent spot – which is about 10km across.



In December last year, a team of researchers reported that they had found evidence that the bright patches on the dwarf planet are formed from hydrated magnesium sulphate. Further, a haze observed within the 90km-wide Occator crater was thought to be down to dust, ice particles and water vapour produced when the sun’s rays hit the surface of Ceres, warming a layer of ice beneath. This haze was been found to be present at the dwarf planet’s noon but not at its dusk - an effect that ties in with exposure to solar radiation
Occator crater is thought to be about 80 million years old – relatively young in astronomical terms.
The spacecraft’s overall health remains good, Carol Raymond, the NASA Jet Propulsion Laboratory scientist who is the Dawn mission’s deputy principal investigator said, and it’s operating perfectly with two reaction wheels and its hydrazine jets. Even if the reaction wheels fail, the vehicle can collect all the data scientists want and complete its primary mission by August. If the wheels hold up, the instrument could continue taking data for another year.

And then the scientists will have all of the information they could have hoped for from an orbiting spacecraft. As for the next step, Carol Raymond offered this statement: “It would be nice to land there, wouldn’t it?”

This discovery has also been repeated with the discovery of a white “salty” or water ice spot on a comet. The European Space Agency's Rosetta spacecraft detected relatively large grains of water ice in two different places on the surface of Comet 67P/Churyumov-Gerasimenko (Below).



The Thoughts of Chairman Les



We had another of our joint events with RSPB at Old Moo called "Betelgeuse and Barn Owls". The weather wasn't kind to us at all giving full cloud cover; it was dry with a pleasant 6/7°. We had 3 'scopes, 20x89 binoculars and our high quality displays with lots of free information sheets and leaflets for the public to take away and read. Leanne told us that the day was a total sell-out with some enquiries having to be refused. We provided the optical items together with the display and visual presentation of 'Our Neighbours in the Solar System' and fully active display via 'Stellarium' all proving to be a total success.

Les Marsden

The Greater Green River Intergalactic Spaceport

The Greater Green River Intergalactic Spaceport in the US state of Wyoming, although sounds fantastic, is actually a disappointing dirt landing strip located about 7 km south of the central business district of Green River, on a mountain known locally as South Hill. The so called 'spaceport' is equipped with a solitary runway, 1,700 meter long and 40 meters wide. Its dirt and gravel surface is covered by deep ruts from vehicular traffic. The runway is unattended and there are no buildings or facilities nearby. The only movement here is from a lone substandard windsock that gets picked up by the occasional gust of wind.

For decades, the runway was known as Green River 48U. Then in 1994, the Green River City Council adopted the spaceport moniker as a tourism stunt. The idea was to welcome inhabitants of Jupiter who might wish to take sanctuary in Green River, when their planet was threatened by collision from Comet Shoemaker–Levy 9. Surprisingly, the Federal Aviation Administration (FAA) approved the name change.



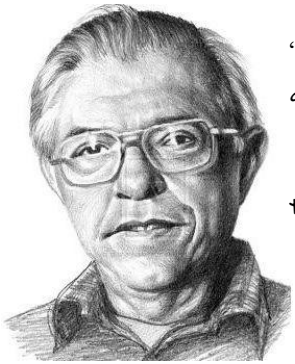
Programme for April & May 2016

Date	Time	Location	Subject / Event	
Thu Apr 7th	19:45	Club Room	"Gravity, Friend or Foe"	*Jez Robinson*
Wed Apr 13th	19:45	Club Room	Executive Committee Meeting	
Thu Apr 14th	19:45	Club Room	Astronomy News	*Various*
Fri Apr 15th	19:45	Observatory	PVE	*Les Marsden*
Sat April 16th	19:45	Observatory	PVE	*Les Marsden*
Thu April 21st	19:45	Club Room	"Gravitational Lensing"	*James Nightingale*
Thu April 28th	19:45	Club Room	"Earth"	*Roy Gunson*
Thu May 5th	19:45	Club Room	"Solar Observing"	*Mick Nicholls*
Mon May 9th	All Day	Observatory	Transit of Mercury	*Andrew Kirton-Vaughan*
Thu May 12th	19:45	Club Room	TBC	*Prof Clive Dickinson*
Thu May 19th	19:45	Club Room	AGM	
Thu May 26th	19:45	Club Room	"Summer Sky"	

Old Moor RSPB – Manvers Way, Barnsley, S73 0YF
Clifton Park –Clifton Lane, Rotherham, S65 2AA
Thryberg Country Park – Doncaster Rd, Rotherham, S65 4NU
PVE – Public Viewing Event – Bookable Only
CAE – Community Access Event
PO – Public Outreach
TBA – To be announced – (otherwise – We don't know!)

Web site: http://msas.org.uk
Meeting room is at Swinton Working Men's Club, Station Street, Swinton, South Yorkshire, S64 8AU.
Observatory is at Lee Brook Lane, Hoober, S62 7SH
Mexborough & Swinton Astronomical Society is Registered Charity N° 1064103 in England & Wales

For submissions to The Messenger - Editor: Roy Gunson: royg@gmx.co.uk



"Space isn't remote at all. It's only an hour's drive away if your car could go straight upwards"

"I don't see the logic of rejecting data just because they seem incredible"

Sir Fed Hoyle