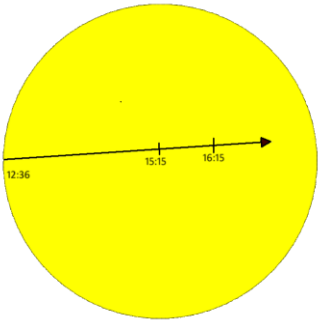
The Messenger
Mexborough & Swinton Astronomical Society
November 2019

Mercury Transit 2019

There are only two other major solar system objects that have phases like the Moon? They are the two inner planets, closer than the Earth to the Sun, these are Mercury and Venus. You can see their phases if you observe them through a telescope. Like our Moon, you can't see the planets in their "new" phase, which is completely dark because of the usual nearness to the Sun. However, when they are aligned perfectly between the Earth and the Sun, which in the case of the Moon, it results in a solar eclipse. In the case of Mercury and Venus, this results in a transit, where the small disc of the planet travels across the face of the Sun. happens this month, as Mercury transits the Sun on November 11! The key times as seen from Hoober will be as follows;



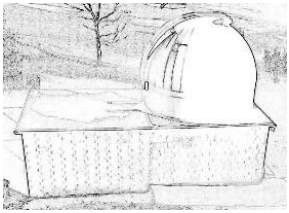
Partial Transit Begins *(Mercury touches the Sun's Edge, Sun 18.5° high)*	12:35pm
Full Transit Begins *(Mercury is fully within the Sun's edge. Watch out for the black drop effect, an optical illusion seemingly connecting Mercury's disc to the Sun's edge.)*	12:37pm
Mercury nearest to centre of Sun *(Mercury is closest to the centre of the Sun as seen from Hoober, Sun close to horizon, 6°.)*	3:15pm
Sunset *(Transit still in progress at sunset.)*	4:15pm

We will be holding a "Transit Watch" on Monday November 11th at the Observatory. There will be tea, coffee and biscuits and we will have a short talk on Mercury during the afternoon. So, get yourselves up there.

You may have seen the transit of Venus in 2012, so let's hope we don't get clouded out again! We will need to use a solar telescope to see anything. Mercury is the smallest planet in our solar system, and closer to the Sun than Venus was in its 2012 transit. This makes Mercury's disc too small to see without the extra power of a telescope. Mercury is $^{1}/_{194}$ th of the apparent diameter of the Sun then you are going to need at least a magnification of 50 or greater to resolve a disk.

The total time for the transit will be 5 hours 29 minutes, however we won't see the end of the transit as the sun will have already set. Officially the transit end at 6:05pm.

The View from the Ob



So, you'll have noticed that the club room has been out of action for a while whilst some remedial work is done on the ceiling, hopefully by the time you read this we will be back in our usual place.
The winter months are now with us and the "Moon Programme" is in full swing. We have some members nights at the Observatory on Saturday 2nd November and Nov 16th to get data so we can have a session looking how to process lunar images later in the season. The November 16th date will be around midnight as we will be looking at a waning moon around 3rd quarter. Be aware also that the club meeting scheduled for November 7th will be at the OBSERVATORY, as hopefully we can do some lunar observations to tie in with Bill Leatherbarrow's lecture.

Don't forget also Monday November 11th from Noon until sunset – we will have the Transit of Mercury to look forward to. This is an event that won't occur again until November 13th 2032. I am going to keep dancing around the totem pole in the hope the rain clouds keep away!

Be seeing You. 

Keep Your Eyes Open



Thursday November 7th "Patrick Moore & our Volcanic Moon"

Bill Leatherbarrow first joined the BAA in 1965 and am an active observer of the Moon and planets. I served as BAA President from 2011 - 2013. Currently Director of the Lunar Section, he also serves on the Committee of the Mercury and Venus Section. In the past he was a member of the Lunar Section Committee under the directorships of Patrick Moore and Ron Maddison and has served as Secretary to the Mercury and Venus Section under the long directorship of Hedley Robinson. He has an observatory containing an Orion Optics OMC300 Mak-Cass.

The Final Frontier I

From the early days of space fiction, the colonisation of our planetary neighbours has been a constant theme. Projects are already in progress and addressing key requirements of colonisation. For example, the US Department of Energy's Nuclear Security Administration, together with Las Alamos Nuclear Laboratory are developing an interplanetary power source. Current power units would be inadequate for the colonists. "Project Kilopower Reactor with Stirling Technology", aims to address this requirement.
Another key requirement for colonisation is communication. In the current developed world we are communicating constantly, not just mouth to ear but electronically. Communication, notification, news, instructions, warnings etc. are all communicated electronically and over the web. Space scientists are already working on Internets that could be established on the Moon or Mars. A network of satellites would be required, similar to Earth's. In order to test the possibilities and viability, a communication satellite will be launched and placed between Earth and the Moon.
It is expected that colonists could be on Mars as early 2025; will there be Wi-Fi?

Mike Hall

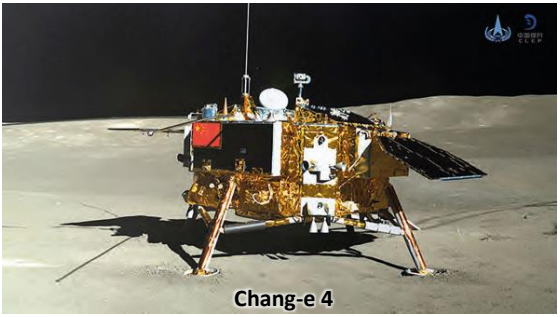
Mike Hall's November 2019 Skynopsis

Diary (all times GMT).

1st	Sunrise 07:02, Sunset 1633
2nd	Moon passes within ½° of Saturn: Members night at Observatory
4th	Moon at First Quarter, 16° high in sky
8th	Sunrise 07:15, Sunset 16:20
11th	**Transit of Mercury**
12th	Full Moon, "Hunter's Moon"
15th	Sunrise 07.28, Sunset 1516:08
16th	Members night at Observatory
18th	Leonid meteor shower
19th	Moon at Last Quarter
22nd	Sunrise 07.41, Sunset 15:59: α-Monocerotid meteor shower
26th	New moon
29th	Sunrise 07.53, Sunset 15.51

Galactic Goodies
Looking North, Summer triangle stars Vega in in Lyra and Deneb in Cygnus are clearly visible in the west. Low in the northwest, the head of Draco and a small portion of Hercules remains above the horizon. Looking South, Orion is above the eastern horizon and parts of the long constellation Eridanus, beginning near Rigel is visible west of Orion. Taurus with the Pleiades cluster and Aldebaran.

The Final Frontier II

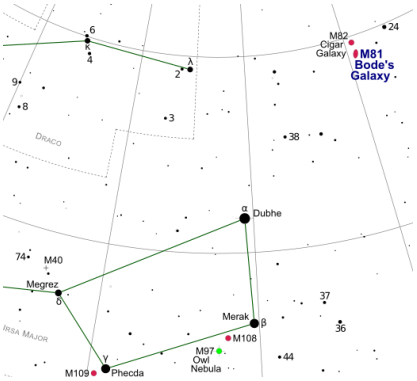


Chang-e 4

The fourth instalment of the Chinese Lunar Exploration Programme and the second Chinese Lander/Rover mission to visit the Moon.
Chang'e is the Chinese Goddess of the Moon. Like its predecessor Chang'e 3 it has placed a lander on the Lunar Surface and release a rover 'Yutu-2'. It will explore areas of the Moon not yet explored. Change-4 made a soft landing in the 'von Karmen' crater in January 2019.One of the largest craters in the South Pole, in the Aitkin Basin on the Far Side of the Moon, not visible from Earth. We see from Earth dark areas 'Mare' on the Lunar Near Side. These planes are scarce on the Far-side, which is peppered with many more 'impact crater'. Recent analysis of the Lunar South Pole has revealed the presence of 'Lunar Water''! Chang-4 was launched on the 7th December 2018 from the XICHANG Satellite Launch Centre, Sichuan Province, on the tip of a 'Long March' rocket.
The Chang-e team partnered with institutions and universities in Germany, Netherlands and Sweden. They provided the Lander and the Yutuk-2 rover with spectroscopes, cameras, neutral atomic analysers and dosimeters.

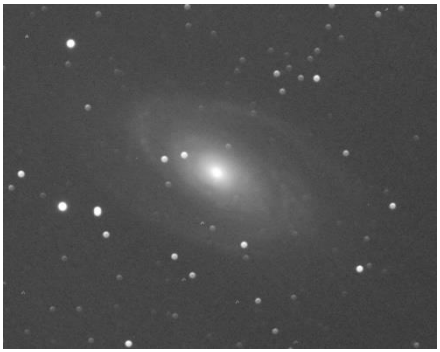
Mike Hall

Messier 81



Messier 81 is also known as Bode's Galaxy, and is a spiral galaxy about 12 million light-years away, with a diameter of 90,000 light years, about half the size of the Milky Way. Found in the constellation Ursae Major, as shown on the map, it forms a pair with M82 (The Cigar). Its active galactic nucleus harbours a 70 million solar mass supermassive black hole. Messier 81 and Messier 82 can both be viewed easily using binoculars and small telescopes but are generally not observable to the unaided eye.

Below are two photographs of the galaxy, one taken with a professional telescope in the USA, the other with my 5-inch celestron from a back garden in Bolton-Upon-Dearne. Can you guess which is which?





Guy Ronson

Leonid and Taurid meteor showers

November will feature the peak of two meteor showers, the Northern Taurids and the Leonids, the latter being the better of the two.
On the same day that Mercury passes across the face of the sun, the Northern Taurids will peak. This is a minor meteor shower, bringing only about five meteors per hour on the night of Nov. 11 into the morning of Nov. 12. However, it is known for its fireballs, or incredibly bright meteors that can light up the entire sky.
The following weekend, the Leonid meteor shower will peak on the night of Saturday, Nov. 16, into the early hours of Sunday, Nov. 17. Onlookers can expect around 15 meteors per hour, with the greatest number of meteors coming after midnight.

Speakers Wanted

Steve Taylor is looking for more “Member Speakers” to help fill out the program – if you fancy telling us about your astronomical experiences, or any topic you fancy let Steve know. I’m sure many of the members will appreciate any efforts you make.

Saturday October 26th – Thurnscoe "Space Day"



The Society was invited by "Big Local, Thurnscoe" to their "Space Day event in St Helen's Church Hall, Thurnscoe.
Mick Collinson. Roy Gunson and Kris Hudson-Lee attended. We took along the skylark rocket after "rescuing" it from Wath library where it had been on display for some weeks.
Mick brought along his telescope, and we had the societies picture boards, and a short video on the history of the Skylark rocket. Roy Gunson had brought along copies of "Big Al's Star Wheel", which we had had so much fun with at the club room a few weeks ago under Paul D'Silva's tutorledge.
In attendance also was a mobile planetarium in a "blow-up" dome, and displays from a mobile science education unit.
The rain made loading and unloading an experience we would like to avoid in future, but the availability of pie and peas with mint sauce was a bonus for lunch time. P.S. Roy had seconds!



How Many!

The Minor Planet Centre at https://minorplanetcenter.net is the place to look for all those latest discoveries of asteroids and comets. This list all the latest discoveries – and there are loads – with all the telescopes now looking for fainter and fainter objects the list is amazing. As this small article (articelet?) is being written so far in October 2019 they discovered 463 minor planets and 9 comets. In 2019 as a total so far, they have discovered 7,791 minor planets (asteroids to you and me), and 58 comets. Not bas eh! There is also information there about IAWN – International Asteroid Warning Network (is it going to hit us!).

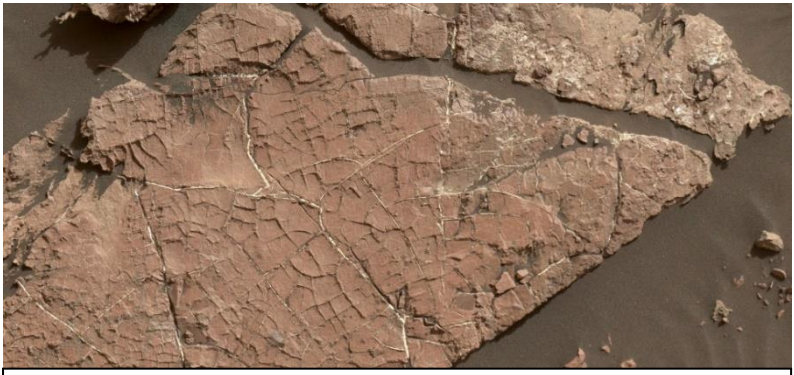
There's also data for every asteroid ever discovered including all the NEA's (Near Earth Asteroids) – enjoy

Roy Gunson

Female Spacewalk

For the first time in spaceflight history, there was an all-female spacewalk when two astronauts, Jessica Meir and Christina Koch, were outside of the International Space Station (ISS) at the same time. The historic event took place on Oct. 18 as the astronauts replaced batteries located on the outside of the station.

NASA's Curiosity Rover Finds an Ancient Oasis on Mars



The network of cracks in this Martian rock slab called "Old Soaker" may have formed from the drying of a mud layer more than 3 billion years ago.

If you could travel back in time 3.5 billion years, what would Mars look like? The picture is evolving among scientists working with NASA's Curiosity rover.

Imagine ponds dotting the floor of Gale Crater, the 100-mile-wide (150-kilometer-wide) ancient basin that Curiosity is exploring. Streams might have laced the crater's walls, running toward its base. Watch history in fast forward, and you'd see these waterways overflow then dry up, a cycle that probably repeated itself numerous times over millions of years.

That is the landscape described by Curiosity scientists in a Nature Geoscience paper published today. The authors interpret rocks enriched in mineral salts discovered by the rover as evidence of shallow briny ponds that went through episodes of overflow and drying. The deposits serve as a watermark created by climate fluctuations as the Martian environment transitioned from a wetter one to the freezing desert it is today.

Scientists would like to understand how long this transition took and when exactly it occurred. This latest clue may be a sign of findings to come as Curiosity heads toward a region called the "sulphate-bearing unit," which is expected to have formed in an even drier environment. It represents a stark difference from lower down the mountain, where Curiosity discovered evidence of persistent freshwater lakes.

Gale Crater is the ancient remnant of a massive impact. Sediment carried by water and wind eventually filled in the crater floor, layer by layer. After the sediment hardened, wind carved the layered rock into the towering Mount Sharp, which Curiosity is climbing today. Now exposed on the mountain's slopes, each layer reveals a different era of Martian history and holds clues about the prevailing environment at the time. "We went to Gale Crater because it preserves this unique record of a changing Mars," said lead author William Rapin of Caltech. "Understanding when and how the planet's climate started evolving is a piece of another puzzle: When and how long was Mars capable of supporting microbial life at the surface?"

He and his co-authors describe salts found across a 500-foot-tall (150-meter-tall) section of sedimentary rocks called "Sutton Island," which Curiosity visited in 2017. Based on a series of mud cracks at a location named "Old Soaker," the team already knew the area had intermittent drier periods. But the Sutton Island salts suggest the water also concentrated into brine.

Typically, when a lake dries up entirely, it leaves piles of pure salt crystals behind. But the Sutton Island salts are different: For one thing, they're mineral salts, not table salt. They're also mixed with sediment, suggesting they crystallized in a wet environment - possibly just beneath evaporating shallow ponds filled with briny water.

Sutton Island's salt-enriched rocks are just one clue among several the rover team is using to piece together how the Martian climate changed. Looking across the entirety of Curiosity's journey, which began in 2012, the science team sees a cycle of wet to dry across long timescales on Mars.

"As we climb Mount Sharp, we see an overall trend from a wet landscape to a drier one," said Curiosity Project Scientist Ashwin Vasavada of NASA's Jet Propulsion Laboratory in Pasadena, California. JPL leads the Mars Science Laboratory mission that Curiosity is a part of. "But that trend didn't necessarily occur in a linear fashion. More likely, it was messy, including drier periods, like what we're seeing at Sutton Island, followed by wetter periods, like what we're seeing in the 'clay-bearing unit' that Curiosity is exploring today."

Given that Earth and Mars were similar in their early days, Rapin speculated that Sutton Island might have resembled saline lakes on South America's Altiplano. Streams and rivers flowing from mountain ranges into this arid, high-altitude plateau lead to closed basins similar to Mars' ancient Gale Crater. Lakes on the Altiplano are heavily influenced by climate in the same way as Gale.

"During drier periods, the Altiplano lakes become shallower, and some can dry out completely," Rapin said. "The fact that they're vegetation-free even makes them look a little like Mars."

Up until now, the rover has encountered lots of flat sediment layers that had been gently deposited at the bottom of a lake. Team member Chris Fedo, who specializes in the study of sedimentary layers at the University of Tennessee, noted that Curiosity is currently running across large rock structures that could have formed only in a higher-energy environment such as a windswept area or flowing streams.

Wind or flowing water piles sediment into layers that gradually incline. When they harden into rock, they become large structures similar to "Teal Ridge," which Curiosity investigated this past summer.

"Finding inclined layers represents a major change, where the landscape isn't completely underwater anymore," said Fedo. "We may have left the era of deep lakes behind."

Curiosity has already spied more inclined layers in the distant sulphate-bearing unit. The science team plans to drive there in the next couple years and investigate its many rock structures. If they formed in drier conditions that persisted for a long period, that might mean that the clay-bearing unit represents an in-between stage - a gateway to a different era in Gale Crater's watery history.

"We can't say whether we're seeing wind or river deposits yet in the clay-bearing unit, but we're comfortable saying is it's definitely not the same thing as what came before or what lies ahead," Fedo said.



Filled with briny lakes, the Quisquiro salt flat in South America's Altiplano represents the kind of landscape that scientists think may have existed in Gale Crater, which NASA's Curiosity rover is exploring.

Courtesy of NASA/JPL News & Media

Diary

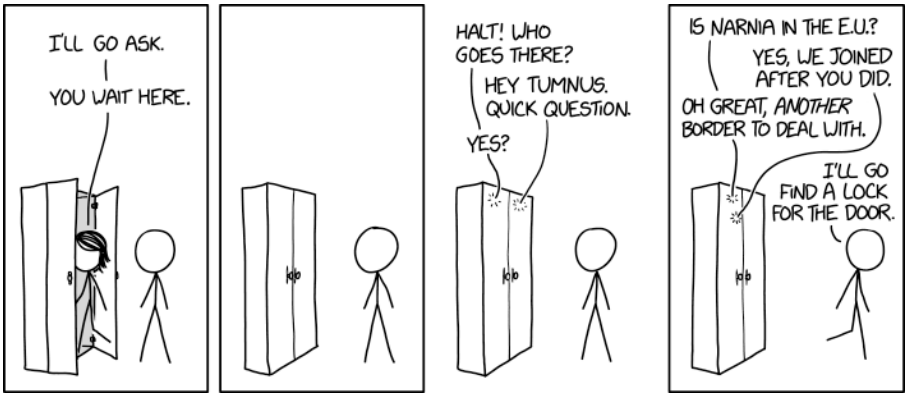
Date	Time	Location	Subject / Event	
Fri Nov 1st	19:45	Observatory	PVE	*Les Marsden*
Sat Nov 2nd	19:00	Observatory	Members Moon Observing	*Roy Gunson*
Thu Nov 7th	19:45	Observatory *	Patrick Moore & our Volcanic Moon	*Bill Leatherbarrow*
Mon Nov 11th	Noon	Observatory	Mercury Transit Event	
Wed Nov 13th	20:00	Club Room	Executive Committee Meeting	
Thu Nov 14th	19:45	Club Room	Winter Sky	*Andy Kirton-Vaughan*
Fri 15th /Sat 16th Nov	22:00	Observatory	Members Moon Observing	*Paul D'Silva*
Thu Nov 21st	19:45	Club Room	Why Does the Sky Change	*Kris Hudson-Lee*
Thu Nov 28th	19:45	Club Room	TBA	*Gary Gawthorpe*
Thu Dec 5th	19:45	Club Room	TBA	*Sue Cartwright*
Fri Dec 6st	19:45	Observatory	PVE	*Les Marsden*
Wed Dec 11th	20:00	Club Room	Executive Committee Meeting	
Thu Dec 12th	19:45	Club Room	TBA	*Heloise Stevance*
Thu Dec 19th	19:45	Club Room	Jez's Jungle Bells	*Jez Robinson*
Thu Dec 26th			NO MEETING	

***NOTE: Bill Leatherbarrows talk is currently scheduled to take place at the Observatory**

(Details correct to time of publication)
PVE – Public Viewing Event – Bookable Only
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 Nº 1064103 in England & Wales

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



CC License https://xkcd.com/license.html