CELEBRATING 40 YEARS 1978 - 2018

The Messenger

Mexborough & Swinton Astronomical Society

February 2019

OUT NOW

SPECIAL EDITION INSTRUCTIONS ON USE OF OUR NEW CAMERA FOR THE OBSERVATORY



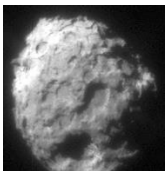
Members should have a PDF copy in their mailbox now!
Hard copy at the front in clubroom

What's in a Comet?

A comet is made of a mixture of ice, frozen gases, rocks, maybe some metals, and lots of dust particles. The bright point of light in the head of a comet is the nucleus. The nucleus is where all this material resides. The other main feature are the "tails" which are just material being boiled away in the suns heat from the nucleus.

A comet far from the Sun is only the nucleus; it has no head or tail. The nucleus may be dozens of miles in diameter or just a mile or two. The nucleus is really the comet, so we will call it that, the tails are really a small amount of material ejected! Usually a comet is a small solar system object and because the comet shines only by the reflected light of the Sun, a distant comet is faint and hard to find.

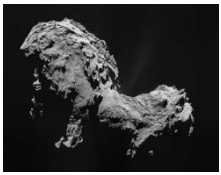
Images of Halley's comet from a European Space Agency probe that passed very close to it in 1986 show plumes of gas and dust from geyser like vents or holes, spraying into space from areas where the Sun was warming the surface. In Larry Niven's novel "Lucifer's Hammer" a comet was described as a "Hot Fudge Sundae"



Comet West 2



Halley's Comet



Comet 67P

In 2004, NASA's Stardust probe got close-up images of the comet Wild-2. This comet some 3 miles across seems to show impact craters, sink holes and sharp peaks. The probe detected at least 10 active gas vents. In August 2014, the Rosetta spacecraft reached Comet 67P/Churyumov–Gerasimenko). Rosetta orbited the comet while the comet orbited the Sun until the end of the European Space Agency mission in September 2016. Its photographs revealed a comet shaped roughly like a duck. Astronomers referred to the "body and head of the duck" as two lobes of the comet connected by a thinner structure, they named the neck. It is possible that the odd-shaped comet was formed by the low-speed collision of two earlier objects.The dust and gas in a comet's coma are subject to disturbing forces that can give rise to a comet's tail(s): the dust tail and the plasma tail. The pressure of sunlight pushes the dust particles in a direction opposite the Sun, producing the comet's dust tail.

The other type of comet tail is a plasma tail (also called an ion tail or a gas tail). Some of the gas in the coma becomes ionized, or electrically charged, when struck by ultraviolet light from the Sun. In that state, the gases are subject to the pressure of the solar wind, an invisible stream of electrons and protons that pours outward into space from the Sun. The solar wind pushes the electrified cometary gas out in a direction roughly opposite of the Sun, forming the comet's plasma tail. The plasma tail is like a wind sock at an airport: It shows astronomers who view the comet from a distance which way the solar wind is blowing at the comet's point in space. When a comet heads inward toward the Sun, its tail or tails stream behind it. When the comet rounds the Sun and heads back toward the outer solar system, the tail still points away from the Sun, so the comet now follows its tail.

The coma and tails of a comet are just a vanishing act. The gas and dust shed by the comet to form the coma and tails are lost to the comet forever — they just blow away. By the time the comet travels far beyond the orbit of Jupiter, where most comets come from, it consists of only a bare nucleus again, and that nucleus is a little smaller, due to the gas and dust that it sheds. The dust the comet loses may someday produce a meteor shower, if it crosses Earth's orbit. Every time a comet comes nearer to the sun and forms it tails it is losing mass. It is thought that Halley's comet decreases by at least a meter (39.37 inches, or slightly more than a yard) every 75 to 77 years when it passes near the Sun. The nucleus is only about 10 kilometers (10,000 meters or 6.2 miles) in diameter right now, so Halley's comet will survive only about 1,000 more orbits, or about 75,000 years. Dust shed by the famous comet causes two of the top annual meteor showers, the Eta Aquarids and the Orionids.

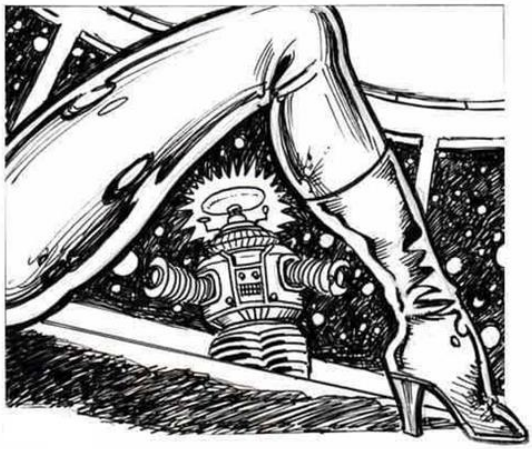
From the Final Frontier

'Lucy in the Sky': - NASA is planning a mission to Jupiter's mysterious Trojan asteroids. These asteroids orbit Jupiter in two groups; one ahead and on behind in the two Lagrange points. The mission is named "LUCY", after the pre-historic skeleton which reveals knowledge of our past. The satellite is expected to reveal further information of our solar system's past.
The mission is still in the planning stage as part of NASA's "Discovery Programme" and will be operated by NASA's Goddard Space Flight Centre and Southwest Research Institute. The spacecraft will include remote sensing instruments to study the geology, surface composition and physical properties, such as mass and densities of these Trojan asteroids.
Launching in 2021; between 2025 and 2033, Lucy will fly close to seven different asteroids. First in the 'Main Asteroid Belt', and then making its way out of the asteroid belt and finishing by observing a rare binary asteroid.

Mike Hall

Somethings to Look Out for this Month

Comet C/2018 Y1 (Iwamoto) is forecast to reach its brightest, at around mag 7.7. It will lie at a distance of 1.28 AU from the Sun, and at a distance of 0.30 AU from the Earth. From Swinton & Hoober it will be visible virtually all night. The comet is moving very fast in the sky and will reach its brightest just below the constellation of Leo. You will need to check on line for its exact position.
The Moon and M44 (The Beehive Cluster) will be close together on the 18th of February, they should be visible together through a pair of binoculars. Hopefully the brightness of the Moon will not drown out the cluster as it is only one day away from full.
You may get a glimpse of Mercury this month – reaching greatest elongation from the sun on the 26th February, however it will only be about 10° above the horizon at sunset so you need to pick a high ground location with a clear view of the horizon to stand a chance.



"Mrs. Robinson, are you trying to seduce me?"

Keep Your Eyes Open



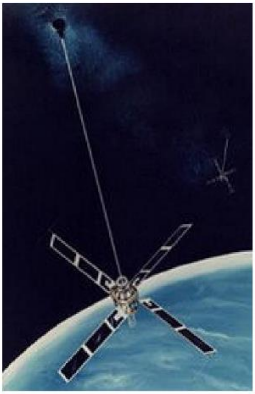
Paul Money is coming back to complete his "Vikings at Barsoom" talk on the 28th of February. He left us halfway through this Saga, Was there an "EastEnders" style cliff-hanger to the first talk. Would the little Vikings survive? Where were the Martians? What would happen next?

Thursday, 21st March 2019

Life after Skylark

Presented by: Roger D Cooper M.Phil et.al. FRGS, MRIN.

The British Government ended support for the Skylark Sounding Rocket programme in 1979.



Thus opened new opportunities in space technology.

The use of orbiting spacecraft to derive a position anywhere on the planet is one of many examples.

The allied technologies of 'Sat Nav' provided commercial opportunities on a vast scale.

A tiny fraction of some more obscure applications are presented.

WEEKEND AWAY

Observing Weekend Malham Tarn FSC March 2019

Where	Malham Tarn FSC – a very dark site down to magnitude 5/6.
When	March 2019. If we are quick, we can arrange which weekend.
How Much	£154.80

What does this include?
Sharing a twin room with en-suite bathroom
All meals included (Friday dinner, Saturday breakfast, lunch, dinner, Sunday breakfast).
A chance to observe from one of the best dark sites in the north of England.
Access to the superb country side around Malham Tarn
If you are interested: -



Sign up on the sheet indicating preferred weekends. If you don't mind which weekend then tick all boxes.

The weekend is available for members, partners and family. Indicate for how many people you are booking.

Deposits of £50 by the end of January 2019. Cheques made payable to MSAS.

Further details from Paul D'Silva.



The Ancient MSAS Astronomer

I first got interested in astronomy about 70 years ago as a primary school pupil. I was walking with my Mum to visit an aunty when I noticed the full Moon rising over the horizon. Being of young age I was always impatient of walking and liked running. So off I started for about 50 yards or so then back to Mum. I noticed that whichever way I ran the Moon seemed to follow me. I asked both my parents and stock answer was ask your teacher. So, what did teacher say? Go to the public library and ask them for a book.

So, to cut a very long and convoluted journey to find out that because the Moon was so far away that it appears to follow you in any direction you walk. Also, if you walk towards or away from it the size does not alter. As I had found out the answer for myself which adults could not answer I got caught up in astronomy from a tender age. The majority of adults then did not ask fundamental questions like this as living just after the world war 2 was very harsh and just surviving was a great effort. I can still remember having to use ration books for basic foodstuffs. I did not know Pythagoras but my great granddad went to school with him lol!

It is surprising what you can learn by no optical aid at all just by reading what other ancient astronomers have discovered about our solar system and how the stars are much more distant than our solar system. So, if you only have a pair of binoculars there are loads of objects you can see in the night sky for your entertainment. My first telescope was a 60 mm refractor telescope focal ratio of f 15 giving me a total focal length of 900 mm. I bought a decent 18 mm plossel eyepiece and with very patient viewing I found that I could see objects which I had only seen pictures of before. In the early 60's and 70's there were only a few photos available in books and the public library was basically your only option to see them. Now anybody can go onto the web to observe wonderful photos even by amateurs to whet their appetite.

I hope that we can help members to utilise their telescopes and expand their interests into using software to make their visual work much more enjoyable. For those of you who already dabble in astro photography there are members who already use or have used your programs so will help you fine tune your settings using the software. So just ask at any Thursday night meeting and help will be available. Remember the most stupid question is the one you do not ask.

It was nice to see a good turnout for the Thursday meeting at the observatory, people having to stand as all the chairs were occupied. Many thanks to Tony Morris for his introduction to our new colour camera. it was a bit like a comedy show with the lights over the screen keep turning off and the howls of do not touch the light switch, hope this fault has been solved.



ZWO ASI 071 MC PRO

My input is as follows only basic information about the camera. Tony suggested only cooling the camera down to –15 degrees centigrade as the extra gain from cooling more was only marginal and all your darks could be calibrated from the one set of darks. I checked up on the web and also found another take on this idea. There is a thing called thermal heating and contraction of different materials. Simply put if you heat or cool different types of bonded materials they expand or contract at different rates. so, a gradual cooling or heating rate is required to maintain their shape. If you cool and then heat up a CCD or CMOS sensor too much too quickly then over a period of time it will probably alter the spacing of the individual pixels on the chip so making it less efficient at recording light falling onto it all at a constant focus. So, there are now at least 2 reasons to not overcool the camera.

A little simple maths to conclude this article, a 35 mm full frame camera with a 50 mm lens fitted to it gives you a horizontal field of 36 degrees and a vertical field of 24 degrees. The measurements are 36 mm horizontal and 24 mm vertical and 43.2 mm for the diagonal (top left corner to bottom right corner) for the sensor. However, our new camera is a 2/3 size so using this figure you will get 36/2 X 3 degrees and 24/2 X 3 horizontal and vertical for a 50 mm lens which is 24 degrees by 16 degrees. If you then remove the 50 mm lens and couple it to the Take telescope the focal length becomes 1000 mm. So, you have 20 times increase in focal length and this results in 20 times decrease in the field size. So, your field of view becomes 24/20 degrees for the horizontal and 16/20 degrees for the vertical. This then gives 1.2 degrees for the vertical and 0.8 degrees for the vertical. Should fit M31 and M33 nicely. Using the same maths for the C14 telescope 14 inches time the focal ratio of F 10 gives 140 inches to convert to mm multiply this by 25.4 and you get the focal length of the C14 at 3556 mm.

So, divide this by 50 for a 50 mm lens and you get a rounded-up number of 72 if you use 3600 mm instead of 3556 mm. This then gives for our new camera 24/72 degrees for the horizontal and 16/72 degrees for the vertical. Multiply these by 60 to get the field size in minutes of an arc and you get 20 minutes of an arc or one third of a degree for the horizontal. Similarly, for the vertical you get 13.33 minutes of an arc, slightly less than a quarter of a degree.
So, using these figures you can calculate what size object will fit into each telescope at the observatory provided you centre them in the field of view. In closing the last few calculations were used using Pythagoras theorem,

Great Granddad could not help me with this even though he was in the same class because he said he never understood what he was saying in fact it was all Greek to him LOL.

Colin Jubb



SYMBOLS FOR THE PLANETS AND BODIES

	JUPITER	THE SUN
MERCURY	SATURN	CERES
VENUS	URANUS	VESTA
EARTH	NEPTUNE	JUNO
MARS	PLUTO	THE MOON

Diary

Date	Time	Location	Subject / Event	
Fri Feb 1st	**19:45**	**Club Room**	**Englishman, Frenchman and a Spectroscope**	*Dr Alan Chapman*
Thu Feb 7th	**19:45**	**Club Room**	**Dawn – A Mission Retrospective**	*Paul D'Silva*
Sat Feb 9th	**16:00**	**Clifton Park**	**"Planets in the Park" – Public Outreach**	*Club Members*
Mon Feb 11th	**18:00**	**Observatory**	**11th Mexborough Cubs**	*Paul D'Silva*
Wed Feb 13th	**20:00**	**Club Room**	**Executive Committee Meeting**	
Thu Feb 14th	**19:45**	**Club Room**	**Astro Clinic**	*Various*
Fri Feb 15th	**19:30**	**Observatory**	**PVE**	*Les Marsden*
Thu Feb 21st	**19:45**	**Club Room**	**Spring Sky**	*Andy Kirton-Vaughan*
Tue Feb 26th	**18:00**	**Observatory**	**82nd Sheffield Cubs**	*Roy Gunson*
Thu Feb 28th	**19:45**	**Club Room**	**Vikings at Barsoom Part 2**	*Paul Money*
Tue Feb 26th	**18:00**	**Observatory**	**82nd Sheffield Cubs**	*Paul D'Silva*
Thu Mar 7th	**19:45**	**Club Room**	**TBA**	*Phil Muffett*
Wed Mar 13th	**20:00**	**Club Room**	**Executive Committee Meeting**	
Thu Mar 14th	**19:45**	**Club Room**	**TBS**	*Steve taylor*
Sat Mar 16th		**Old Moor**	**RSPB Manvers – Public Outreach**	
Thu Mar 21st	**19:45**	**Club Room**	**Life After Skylark**	*Roger Cooper*
Thu Mar 28th	**19:45**	**Club Room**	**Annual Photo Competition**	*Tony Morris*

(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
Old Moor RSPB – Manvers Way, Barnsley, S73 0YF
Clifton Park - 40 Doncaster Rd, Rotherham S65 2BH
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
Masonic Hall - Swinton Masonic Hall, 63 Station St, Swinton, Mexborough S64 8PZ
Mexborough & Swinton Astronomical Society is Registered Charity N° 1064103 in England & Wales

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

The Solstitial Points are the two points of the ecliptic most distant from the equator. The times when the sun' comes to them are called solstices. The summer solstice occurs about the 22nd of June, and the winter solstice about the 22nd of December. The Equinox's are the two points were the Sun crosses the celestial equator and these occur on or near March 21st or September 22nd. The celestial Equator divides the night sky into two on a sphere that is divided into Right Ascension and Declination just as the Earth's Globe is divided into Longitude and Latitude.