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NEXT MEETING
THURSDAY, 16th June 2016
THE ASTRONOMICAL SOCIETY OF HARINGEY
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SOCIETY NEWS

MEETING VENUE

Music Block, Ashmole School, Southgate, London N14 5RJ.

The day for meetings is usually the third Thursday of each month. The exceptions are August, when we do not hold a meeting, and this now currently applies to the July and December meetings, though that may alter in the future.

However, in case of changes it is always advisable to double-check the dates below.

Doors open - 7.30pm : Main speaker - 8.00pm : Finish - 10.00pm sharp!

For more on this, and general meeting information, also check the website page:
www.ashastro.co.uk. Last minute changes will be on the Facebook page



OBSERVING EVENINGS

Regarding any changes to Observing Evening meetings, this is a continuing message to let Observing Officers Jim Webb, Alister Innes or Kyri Voskou know your mobile phone number. And, if not already on the list, your email address - emailed to observing@ashastro.co.uk - reaches all three. The Facebook page will also be used.

2016

June 16th : Michael Franks : "SpaceX and the way to Mars"

July : no meeting this month

August : no meeting this month

September 15th : Jerry Stone : "Nell, Esther and Aunt Effie"

- the explanation as to the title nearer the time!!

October – 20th : AGM

November -17th : Observing Evening

December : no meeting this month

MESSAGE FROM THE TREASURER

Dear members, it's subscription renewal time for many of you and emails have been sent out to remind you, so please renew at the next meeting or by payment direct to the Society bank account.

Many thanks, Kyri Voskou – Treasurer ASH

COVER

Life on Mars? Well there will be if Elon Musk and SpaceX get their way.

Michael Franks has been exploring the possibilities – find out more at the next meeting

SOCIETY NEWS



Find us on
Facebook

For up-to-date information, we are using that 'necessary evil' - Facebook. Note as this is an Open Group you do not have to be a member of Facebook to read posts and messages, you just need some form of Internet access.

Go to : www.facebook.com/groups/ASHastro/

However if you want to 'interact' (ie post messages), you have firstly to join Facebook, then, on the ASH Facebook page, ask to join our Group, and you will get 'signed up'.
The more the merrier!



MEETING ROOM

We currently meet on the first floor of the Main Music Block at the School. This is the two-storey building, next to our original room, the original Music Room. This is marked with the X in the photo on left, (and although it is demolished, and the site has been redeveloped with a new structure). We hope a first floor will be suitable for all, as there isn't a convenient lift. If anyone feels they will have difficulty, please let the Chairman know. Contact details on back page.



MEETING PREVIEW

June 16th : Michael Franks : "SpaceX and the Way to Mars"

Elon Musk (*right*) says he wants to visit the International Space Station aboard his own craft by 2020 - and he doesn't think it will be, "*That hard*". Speaking at the StartmeupHK Festival in Hong Kong, Musk said the company was



also looking further ahead, to Mars and beyond, and could unveil its plan to do so as soon as September 2016.

Michael Franks has been digging deeper and will explain more at this meeting

Image left : SpaceX craft with Bigelow expanding modules.

MEEING REVIEW

19th May 2016 : Mat Irvine : "The Underground Corn Circle"

Another excellent departure from the normally astronomy-related talk, but very relevant to the interest of the Society all the same. Mat showed us, via one of his more pictorially-orientated PowerPoint Presentations, the Fermilab installation (named after Enrico Fermi, the Italian nuclear physicist) in Batavia, Illinois, which he had visited a few weeks earlier.

From the air it is an impressive site, even though it is only a quarter the size of the European CERN establishment. The skyline is dominated by a very 'arty' building, which from the top floor gives a spectacular view of the site.



Possibly linked to his Doctor Who pedigree, he was taken down to the 'inner sanctum' of the facilities, by media officer Andre Salles, (*right in the image*), who also happens to be an ardent Who fan! The accelerator ring itself is a one mile diameter collection of powerful magnets and lots of cryogenic cooling. The appropriate particles are then accelerated a few times round the ring and smashed and bashed into a target to see what comes out.

We were also shown the MUON g-2 Experiment a 50 foot diameter ring which was moved (without disassembly!) from Brookhaven, NY in the summer of 2013, via road and water, for 3200 miles. We were then shown the current NOvA Neutrino Experiment. 'NOvA' = NuMI (Neutrinos at the Main Injector) Off-axis ν_e (ν_e = electron neutrino) Appearance – don't you just love acronyms? In the depths of the NOVA facility, one of the detectors for the neutrinos is so sensitive that even the flash of a camera will give a positive 'detection' reading – so Mat was asked not to use flash in case they detected a possible 'mat-onium' particle! The neutrinos created here are detected at the far detector, 500

miles away, in Minnesota. In theory this is a straightforward task as the zillions of neutrinos from the Sun pass through the Earth per second - virtually unimpeded. Detecting these subtle particles requires very delicate and sensitive equipment. All this constitutes fundamental subatomic particle research with relevance to how stars create their energy and other cosmic matters.

An entertaining and educational talk.

Jim Webb



Image above – the detector that picks up camera flashes – so this was taken by available light!

CHAIRMAN'S QUARTERS



I've always been interested in how bones fit together and how they move. Their movement is, of course, actuated by muscles connected to the bones by short or long sinews, the tendons. This was another fascination – how they fitted together, which was shown in drawings in anatomy books and other references. In higher education I learned that muscles contract by way of myofibrils, small string-like fibres, which contract depending on the amount of nervous stimulation applied to them.

When practical robots (not the science fiction types in movies and TV) started appearing, the general form of how bones move was used but with fixed linkages that could move in one plane only. The linkages would then move (mostly) by electric motors either linked directly to the joints or via gears or even chains. Rotation was achieved by direct rotation of an armature connected to the mechanical arm. These basic mechanisms have given rise to the modern robotic arm which is capable of movement in as many as 5 axes – much more complex than our arms and legs but still a collection of motor driven mechanisms that are generally very bulky. A more 'physiological' approach would be the use of multiple connecting cables attached to the armatures so they can be pulled in either direction, much in the way our bones are connected via opposing tendons – muscle can only pull. This approach would require either remotely placed motors to wind the cable (and release it when pulled in the opposite direction) or by hydraulic mechanisms to pull and release.

Generally, these mechanisms are chunky, very solid and can do much damage if they go out of control – people have already been killed by industrial robots. A research team at Harvard's Wyss Institute for Biologically Inspired Engineering have worked on the concept that to make robots more cooperative and to have them perform tasks in close proximity to humans, they must be softer and safer. They developed actuators that are like real muscles in that they are soft, shock absorbing, and pose no danger to their environment or humans working alongside them. These actuators, called VAMPs (Vacuum-Actuated Muscle-inspired Pneumatic structures), comprise of soft rubber or 'elastomeric beams', filled with small, hollow chambers of air like a honeycomb. By applying a controlled vacuum, the chambers collapse and the entire actuator contracts, generating movement. The internal honeycomb structure can be custom tailored to enable linear, twisting, bending, or combinational motions. What is more, they can be made any appropriate size to fit into spaces that motors cannot fit into and also be stacked on top of each other, much in the way our muscles are arranged.

The team envisions that robots built with VAMPs could be used to assist the disabled or elderly, to serve food, deliver goods, and perform other tasks related to the service industry. What's more, soft robots could make industrial production lines safer, faster, and quality control easier to manage by enabling human operators to work in the same space.

Although a suitably complex control system has not yet been developed for VAMPs, this type of actuator is easy to control due to its simplicity - when a vacuum is applied, VAMPs contract. They could be used as part of a tethered or untethered system depending on environmental or performance needs. Furthermore, VAMPs are designed to prevent failure - even when damaged with a 2mm hole, the team showed that VAMPs will still function. In the event that major damage is caused to the system, it fails safely because it can't explode and is therefore intrinsically safe. Whereas other actuators powered by electricity or combustion could cause damage to humans or their surroundings, loss of vacuum pressure in VAMPs would simply render the actuator motionless.

The question now is where to put all that vacuum equipment!

See you in June

JIM

[NEWS - compiled by Kyri Voskow](#)

TUTANKHAMEN YIELDS FURTHER SURPRISES

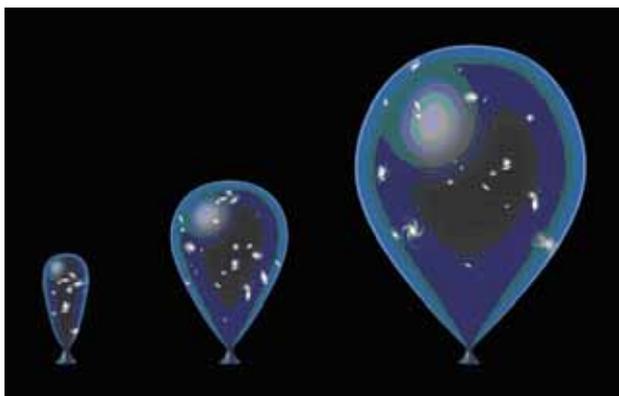
Portable Fluorescence Spectrometry is not one of your everyday phrases, but a very useful tool indeed.

Italian and Egyptian researchers used the technique to examine Tutankhamen's famous dagger – found alongside him in his sarcophagus. What they found was very interesting – the dagger is made from a meteorite!

Not only do they now know it's made from 'space-iron' (with a lot of other bits thrown in), but they may have also worked out exactly which meteorite it came from – Kharga, which was found in 2000, 150 miles west of Alexandria. Analyses of the chemical compositions of dagger and meteorite have thus far been identical.



THE UNIVERSE MAY BE EXPANDING MORE QUICKLY THAN FIRST THOUGHT



The Hubble Space Telescope is still producing amazing data – the latest of which suggests that the Universe is expanding between 5% and 9% faster than previously thought.

The rate of growth is 45.5 miles per megaparsec (3.26 million light years) and doesn't tally with predictions made using the cosmic background radiation. The new data throws a spanner into Einstein's works and once again brings to light (no pun intended) the effect that dark matter may have in shaping our Universe.

SPACE SHUTTLE – SMALL

The Indian Space Research Organization (ISRO) has successfully tested its first small space shuttle.

Although other space-faring nations have stopped using winged reusable craft India hopes that investing in this area may reduce costs by 90%. A rocket carrying the mini-shuttle lifted off from a launch pad in southern India and went on to complete a 13-minute test flight. An ISRO spokesman points out that although the test was a success, full-sized craft were still a number of years away.





SPACE SHUTTLE - LARGE

California Science Center in Los Angeles has a new resident – a huge Space Shuttle ET – the External fuel Tank. The tank had to squeeze through the city streets in order to join the retired Orbiter Endeavour on display. Weighing 33-tons and measuring 154-foot-long, the tank made its 5mph journey some 15 miles from Marina del Rey, where it had been delivered by barge, to Los Angeles. Trees had to be trimmed and a stop-light moved in order to inch the massive object to its destination.

HYPERSONIC ROCKET HITS MACH 7.5

The Australian desert was the scene of an unusual test launch in mid-May – the Hypersonic International Flight Research Experimentation (HIFiRE)

US and Australian boffins created the rocket, aimed at producing an engine which can fly consistently at Mach 7. Although such engines can already be developed, they produce so much heat they end up causing themselves to melt.

This project aims to deal with that problem and produce a vehicle that can

both fly into space and can also go from London to Sydney in just two hours.

It won't be a rush-job though. There will be a number of different stages to the project with the next one – detaching the engine from its booster rocket, not due until next year.



THE STARS LEAD SCHOOL PUPIL TO A LOST MAYAN CITY

William Gadoury, a 15 year old from Quebec, has just discovered a lost ancient city.

Having wondered why the Maya built their cities in unusual places, and knowing that the Mayans worshipped the stars, the bright youngster put two and two together and theorised that the ancient developments mirrored their heavenly equivalents.

When he saw that 117 Mayan cities were mapped out just like the night sky, he noticed one particular city was 'missing' – there was a star in the sky but no corresponding city on the ground.

He used this knowledge to predict the position of the lost city – in the southern Yucatan, close to Belize, showed over 30 structures including what appears to be a pyramid almost 300 feet tall! – then checked satellite images provided by the Canadian Space Agency.

Finances prevent a research trip to the site at the moment but archaeologists are confident that in due course a trip will be made and young William's discovery fully explored.



THE NIGHT SKY : THE PLANETS :

July - August 2016

MERCURY : In the early dawn skies but low down and difficult to view. At superior conjunction - on the far side of the Sun - 7th July. In conjunction with Venus 16th July.

VENUS : Was at superior conjunction 6th June. After which moving into the evening skies. But the planet will be low down for months and not really well placed for viewing until November. There will however be a close encounter with Mercury on 16th July and Jupiter on 27th August.

MARS : Reaches opposition, when the Earth lies between it and the Sun on 22nd May. However the planet was closest to the Earth, and so have the greatest angular size of 18.6 arc seconds eight days later on the 30th. At closest approach in 2003, Mars reached an angular size of 25.1 arc seconds, its largest angular diameter for 60,000 years. In July 2018 Mars will reach 24.2 arc seconds across but for both this opposition and that in 2018, Mars will be very low in the ecliptic and hence at low elevation so that the atmosphere will limit views of the Red Planet. It will be higher in the sky at the opposition of 2020. Moon to the north 17th June and 14th July

JUPITER : In Leo, still bright in the south, though past its best. This brightness falls slightly from magnitude -2.3 to -2.1 whilst its angular size drops from 41 to 37 arc seconds. However a small telescope should show the equatorial bands in the atmosphere, maybe the Great Red Spot and a selection of the Galilean moons. Moon to the south 11th June. In conjunction with Venus 16th July

SATURN : reached opposition and due south at 01.00hrs (BST – midnight UTC) 3rd June, and so visible in the southeast at nightfall, not setting until dawn It is moving slowly in retrograde motion in the lower part of Ophiuchus, close to the fan of three stars that makes up the head of Scorpius. Still a good time to observe the planet as the rings span some 41 arc seconds across. These are still tilted 26 degrees from the line of sight - almost as open as they can be. Moon to the north, and 18th-19th June and 16th July

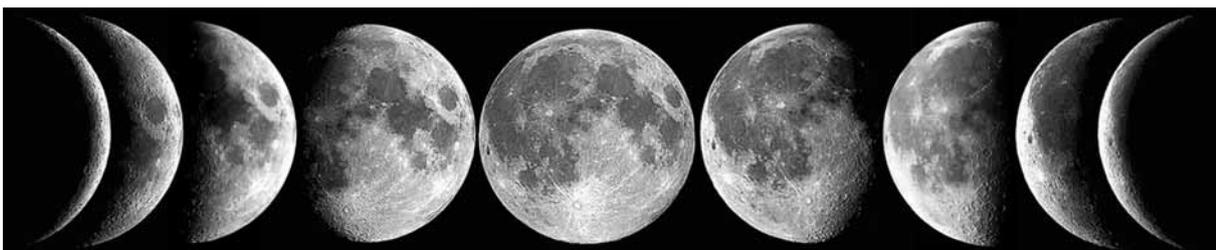
URANUS : Moon to the south 28th June and 26th July

NEPTUNE : Moon to the north 23rd July.

METEORS

Lyrids reach their peak on 15th – 16th June, so the day of the June meeting

THE MOON



New 5th June

First 12th

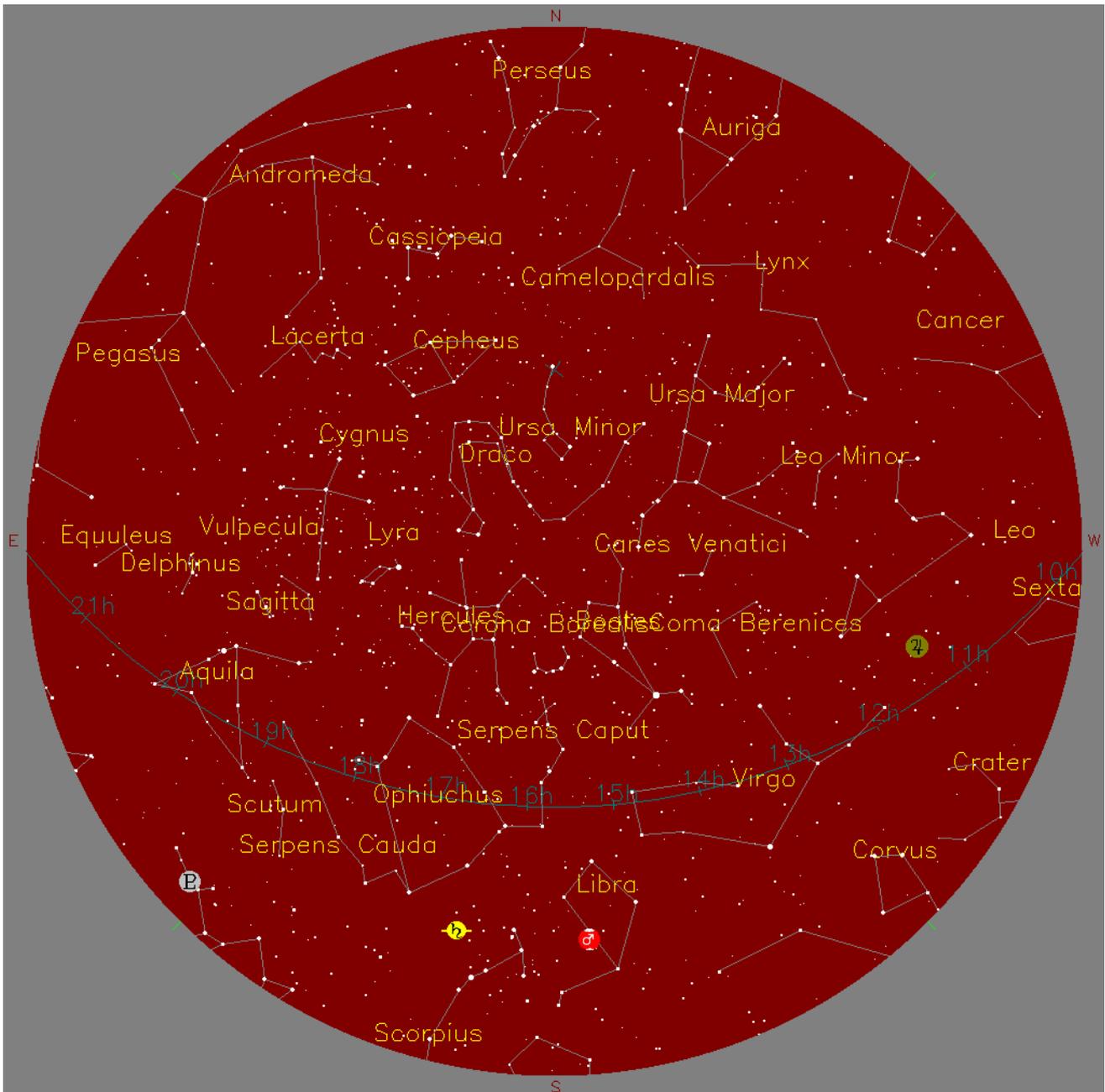
Full 20th

Last 27th

New 4th July

THE NIGHT SKY : MAP

1st July 2016, 22.00hrs GMT / 21.00hrs UTC



KEY	
 MERCURY	 SATURN
 VENUS	 URANUS
 MARS	 NEPTUNE
 JUPITER	 PLUTO



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