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"Sky-Notes" of the Open University Astronomy Club.

September 2025.

Forthcoming Meetings.

OUAC "Clubnight".
Tuesday 2nd September.
Special General Meeting to decide the future of the OUAC.
Arrive 19:15 for prompt 19:30 start.
Refreshments Break
Monthly "Sky-Notes".
"Spacenews".

Highlights of the Month.

1st.	**Start of Meteorological Autumn.**
7th.	**Total Lunar Eclipse.** See notes below.
4th.	**Shadow transit of Titan.** See notes below.
12th.	**Lunar occultation of The Pleiades.** See notes below.
13th.	**Mercury at Superior Conjunction.**
19th.	**Lunar Occultation of Venus.** See notes below.
20th.	**Shadow transit of Titan.** See notes below.
21st.	**Saturn at Opposition.**
23rd.	**Neptune at Opposition.**
22nd.	**Autumnal (N Hemisphere) Equinox.**
Mercury.	**Completes a favourable morning apparition in first week.**
Venus.	**Prominent object low in the NE predawn sky.**
Mars.	**Not observable.**
Jupiter.	**Well placed for "early hour" observation.**
Saturn.	**Well placed for nightlong observation.**
Uranus.	**Well placed for midnight to dawn observation.**
Neptune.	**Well placed for nightlong observation.**

Asteroids, Comets, Meteor Showers. See notes below.

Recent Events.

If you have any images and/or reports of recent events please contact Sheridan so that he can put them on the Club website.
If you wish to present them at a "Clubnight" meeting, when resumed, please contact Adrian or myself before the meeting starts.

Software.

A very useful item of Planetarium software is "Stellarium" and it's FREE! Go to their website and download it and the associated user manual.

1. The Solar System.

Note all times shown are UT.
Add one hour when British Summer Time is in operation.

Earth.

1st – Start of Meteorological Autumn.
Autumnal Equinox (Northern Hemisphere) **22nd 18h 19m.**

Aurora.
Increasing hours of darkness improve the opportunity for observing potential aurora.
Activity tends to increase around the Equinoxes.
Keep tuned to the www.spaceweather.com website for updates.
Subscribe (free!) to the UK AuroraWatch website to receive alerts.

Artificial Satellites.
For details of passes of the ISS and other bright satellites go to the "Heavens Above" website and set-up forecasts for your location.
Alternatively go to the "spaceweather" website and click the "Flybys" button and set-up forecasts for your location.
Add to your "favourites".

Sunrise and Sunset.

Bedford.
Latitude 52° 6.9' N Longitude 0° 28.1' W

Date.	Rise.	Transit.	Set.
01	05h 14m	12h 02m	18h 49m
08	05h 25m	11h 59m	18h 33m
15	05h 37m	11h 57m	18h 16m
22	**05h 48m**	**11h 54m**	**18h 00m**
29	06h 00m	11h 52m	17h 44m

Produced using "Starry Night Pro".

The Sun.

Observing.

To prevent permanent damage to your eyes avoid looking at the Sun directly and never with binoculars or a telescope unless special filters are used.
The safest way is the simplest – project the image of the Sun onto grey or white card.
If you have or have access to observe in h-alpha the rewards are much greater.

Solar Cycle 25 at **Solar Max** continues to produce impressive activity.

Keep in touch with the **S**olar **D**ynamics **O**bservatory satellite at http://sdo.gsfc.nasa.gov/
Add the "Spaceweather" and the "Soho" websites to your "favourite" websites.

The Moon.

Phases:

Produced using “LunarPhase Pro”.

Full.	$07^{d}\ 18^{h}\ 08^{m}$	**Total Lunar Eclipse.** See notes below.
Last Quarter.	$14^{d}\ 10^{h}\ 33^{m}$	
New.	$21^{d}\ 19^{h}\ 55^{m}$	**Partial Solar Eclipse.** Not UK.
First Quarter.	$29^{d}\ 23^{h}\ 54^{m}$	

Apsides:

Perigee.	$10^{d}\ 12^{h}$	Diameter. 32’ 44”	Distance.	364,778km.
Apogee.	$26^{d}\ 10^{h}$	Diameter. 29’ 27”	Distance.	405,547km.

Observing.

For northern observers:

The waxing crescent Moon is not well placed.
The waxing gibbous Moon is less well placed.
The Full Moon is becoming well placed.
The waning gibbous Moon is very well placed.
The waning crescent Moon is very well placed.

Observing cont.

Observe the regions along the terminator (sunrise and sunset on the Moon) where the low angle of the Sun highlights lunar topography. A basic lunar map is all you need to get started. *Sky & Telescopes* "Lunar 100 Card" is another good starting point. If you are starting out on photography and/or imaging the Moon provides an excellent target.

Opportunities.

From 8th to 14th clear September evening to predawn skies provide excellent opportunities to image the well placed waning gibbous to Last Quarter Moon.
From 14th to 20th clear September "early hour" to predawn skies provide excellent opportunities to image the Last Quarter through waning crescent Moon.
Note the effects of **Libration** to see what is observable on the Lunar Limb.
The **Mare Orientale** is a fascinating area when Libration is favourable.
If you can take images to share so much the better!

Lunar Occultations.

Unlike the gradual disappearance of a planet (small disc) a star vanishes instantly demonstrating that it is a point source of light as viewed from the earth. For all occultation events start observing 10 to 15 minutes before the predicted time to identify the required star and to allow for slightly different time if you are not at Greenwich. Use an accurate watch to record the time that *you* observe the occultation remembering that times are UT not BST. Enter details in your observing log.

As the Moon rises on 12th about 20:00 it commences an occultation of "The Pleiades" (M45) star cluster.

A clear ENE horizon is required until the later stages.
The Moon will be too low to observe initial members of the cluster disappear behind the Bright Limb.
About 21:00 when the Moon is about 10° high observing becomes much easier.
Stars of the cluster will continue to be occulted by the Bright Limb and those previously occulted will begin to emerge from behind the Dark Limb.
Conditions continue to improve as the Moon continues to gain height until the finish about 23:00.
Simulate the event for your location on "Stellarium" noting timings.

Details of occultations can be found in current *BAA Handbook* and monthly periodicals such as *Astronomy Now* and *Sky at Night*.

The Planets.

Warning!
Never attempt to observe objects close to the sun without taking the proper precautions.
In particular never search for objects near to the Sun with optical instruments or you risk permanent eye damage or blindness.

Mercury.

May just be spotted in the first week as it completes a favourable morning elongation for N observers in the E dawn sky.
About 1° north of Regulus on 2nd.
Superior Conjunction on 13th.
Then not observable in the evening sky.
Moon close on 22nd.

Date.	Mag.	Dia.	Phase.	Rise.	Transit.	Set.
1	-1.3	5.5”	0.89	$04^h\ 02^m$	$11^h\ 21^m$	$18^h\ 38^m$

Venus.

Prominent object low in the NE predawn sky.
Passes about a degree south of **M44** on **1st**.
A great day in store on on the 19th - if clear!
In the predawn sky Venus is will be about 3° south of the thin crescent Moon and less than 1° north of Regulus.
Also on the 19th the Moon occults Venus.
Disappearance behind the Bright Limb about 11:45.
Reappearance from the Dark Limb about 13:05.
Locate the Moon and Venus to commence observing at least 20 minutes before the above timings.
Simulate the event on “Stellarium” or similar software as timings will vary slightly for location.
The Sun is only about 25° to the east so take precautions to shield it from view!

Date.	Mag.	Dia.	Phase.	Rise.	Transit.	Set.
01	-4.0	12”	0.84	$02^h\ 14^m$	$10^h\ 01^m$	$17^h\ 46^m$
30	-3.9	11”	0.91	$03^h\ 40^m$	$10^h\ 25^m$	$17^h\ 08^m$

Mars.

Not observable.
Moon close on 24th.

Date.	Mag.	Dia.	Phase.	Rise.	Transit.	Set.
-	-	-	-	-	-	-

Mission details and progress of “numerous” Orbiters, Landers and Rovers are on the appropriate websites.

Jupiter.

Prominent object available for "early hour" to dawn observation.
Moon close on 16th.

Date.	Mag.	Dia.	Rise.	Transit.	Set.
01	-2.0	34"	$00^h\ 26^m$	$08^h\ 37^m$	$16^h\ 47^m$
30	-2.1	37"	$22^h\ 56^m$	$07^h\ 01^m$	$15^h\ 07^m$

See BAA *Handbook* and/or monthly periodicals for satellite phenomena.
Use "Stellarium" or similar software to simulate events.

Saturn.

Available for nightlong observation with now much improved declination for N observers.
Opposition on 21st.
Watch for and image the **"Seeliger effect"** (Ring Brightening) around the days of opposition. The reasons for the phenomenon are complex involving backscatter of sunlight, polarization and interference effects.
How strong is this effect with the almost edge-on rings?
Titan shadow transits take place on 4th and 20th both occurring in dawn twilight so not easy. The 20th is the "easier" of the two events.
However it will be many years before such events take place again so worth the challenge!
On an easier note Titan will be eclipsed by Saturn's shadow at about 03:23 on the 12th and occulted by Saturn about 01:38 on the 28th
See BAA *Handbook* and/or monthly periodicals for satellite phenomena.
Use "Stellarium" or similar software to simulate events.
Moon close on 8th.

Date.	Mag.	Dia.	Rise.	Transit.	Set.
01	+0.7	19"	$19^h\ 29^m$	$01^h\ 20^m$	$07^h\ 15^m$
21	**+0.6**	**19"**	**$18^h\ 08^m$**	**$23^h\ 56^m$**	**$05^h\ 48^m$**
30	+0.7	19"	$17^h\ 32^m$	$23^h\ 18^m$	$05^h\ 08^m$

Uranus.

Currently a few degrees south of "The Pleiades" (**M45**) and well placed for late evening to dawn observation.
Moon close on 13th.

Date.	Mag.	Dia.	Rise.	Transit.	Set.
01	+5.7	3.6"	$19^h\ 22^m$	$05^h\ 17^m$	$13^h\ 13^m$
30	+5.6	3.7"	$19^h\ 10^m$	$03^h\ 22^m$	$11^h\ 18^m$

Neptune.

Well placed for nightlong observation about a degree north of Saturn so easy to locate.
At Opposition on 23rd.
Moon close on 8th.

Neptune cont.

Date.	Mag.	Dia.	Rise.	Transit.	Set.
01	+7.8	2.4"	$19^h\ 24^m$	$01^h\ 27^m$	$07^h\ 26^m$
23	**+7.8**	**2.4"**	**$18^h\ 00^m$**	**$23^h\ 54^m$**	**$05^h\ 56^m$**
30	+7.8	2.4"	$17^h\ 29^m$	$23^h\ 26^m$	$05^h\ 28^m$

At mag +13.5 Neptune's largest satellite **Triton** provides a good challenge for 8" telescopes under favourable sky conditions when it is at max elongation E or W of Neptune. Use a high magnification - x200 or greater.
Use "Stellarium" (Freeware) or similar software to determine favourable elongations.

Dwarf Planets.

Ceres.

A 7th mag object located in Cetus approaching **Opposition** on **2nd October**.

Eris (2003 UB313).

A mag +18.7 CCD target located in Cetus.

Haumea.

A +17 mag CCD target located in Boötes. Lost in WNW evening twilight.

MakeMake.

A +17 mag CCD target in Coma Berenices. Lst in WNW evening twilight.

Pluto.

A 14th mag object located in Capricornus low in the S mid-evening sky.

Asteroids. (Approx magnitude +10.5 or brighter).

Vesta (4). A 6th mag early evening object in Libra.
Hebe (6). A 7th mag object located in Aquarius.
Julia (6). A 9th mag object located in Aquarius.
Pallas (2). A 9th mag object located moving from Delphinus into Aquila.

Up to date data on www.heavens-above.com
See also the *BAA Handbook* and/or monthly periodicals.

Comets.

3I/ATLAS.

A very interesting object and a very rare chance to observe an Interstellar visitor!
Reaches Perihelion on 29th October when it will still be beyond the orbit of Mars
At the start of September it is a 14th mag evening object in Libra soon to be lost farside of the Sun.
In mid October it reappears as a morning object in Virgo when it could be 11th mag.
During November and December it tracks from Virgo into Leo fading to 14th mag by the end of the year.
Closest approach to the Earth on 19th December when it is predicted to be 13th mag.
Excellent article in September issue of *Astronomy Now*.

Up to date details of comets currently observable can be found on the "heavens above" website.
See also the *BAA Handbook* and/or monthly periodicals.

Meteor Showers.

The **ε Perseids** are active from 5th to 21st with peak activity on 9th, ZHR = 5. Moonlight interferes.

There are always **Sporadic** events and the chance of a brilliant fireball. The latter should be recorded and reported.

Near Earth Objects.

Please refer to www.spaceweather.com for updates.

Eclipses.

A Total Lunar Eclipse on 7th is visible from the UK.

Penumbral Eclipse begins:	15:28	Moon below the horizon.
Umbral Eclipse begins:	16:27	Moon below the horizon.
Total eclipse begins at:	17:31	Moon below the horizon.
The Moon rises in Total Eclipse about 18:45.		
Total Eclipse ends at:	**18:53**	
Umbral Eclipse ends:	**19:56**	
Penumbral Eclipse ends:	**20:55**	

Simulate the eclipse on "Stellarium" or similar software as timings may vary slightly for your location.

A **Partial Solar Eclipse** takes place on 21st. Not visible from UK. Try New Zealand!

2. Deep Sky.

2.1 Variable Stars of the month.

Beta (β) Persei, Algol. Range 2.2 to 3.4, period 2.7 days. Becoming better placed for observation in the "early hours". Suitable minima occur on 05^d 21.1^h and 25^d 19.6^h.
Delta (δ) Cephei. Range 3.5 to 4.4, period 5.37 days. The prototype for the Cepheid class of variable stars. Their period-luminosity relationship has led them to being used as "standard candles" in measuring distances to nearby galaxies.
Mu (μ) Cephei. Range 3.7 to 5.0, approximate period 755 days. A semi-regular variable star famous for its striking red colour being fittingly called "Herschel's Garnet Star". It is the reddest naked eye star visible from the northern hemisphere. Its colour may show signs of variability.

2.2 Double Stars of the month.

Zeta Aqr. See notes below.
94 Aqr. See notes below.
Alpha$^{1\&2}$ Cap. See notes below.
Delta Cep. See notes below.
Struve (Σ) 2816 & 2819 Cep. See notes below.
Struve (Σ) 2840 Cep. See notes below.
Gamma Del. See notes below.
8 Lac. Quadruple system**.** See notes below.
Eta Peg. See notes below.
Pi$^{1\&2}$ Peg. See notes below.
57 Peg. See notes below.

2.3 This Month's Constellations - Double Stars/Star Clusters/Nebulae/Galaxies.

Abbreviations used.

M = Messier object. (Shown in **bold**).
NGC = New General Catalogue. IC = Index Catalogue. (Extension of the NGC).
ds = double star. ts = triple star. ms = multiple star. vs = variable star.
gc = globular cluster. oc = open cluster.
en = emission nebula. rn = reflection nebula.
pn = planetary nebula. snr = super nova remnant.
sg = spiral galaxy. eg = elliptical galaxy. lg = lenticular galaxy. ir = irregular galaxy.
pg = peculiar galaxy.
ly = light year.
The magnitude of an object is shown in brackets e.g. (6.5). All magnitudes are + unless otherwise shown.

Aquarius (Aqr).

Beta (β is a triple star (2.9, 10.8 and 11.4, sep 35.4" and 57.2" from primary).
Zeta (ζ) ds. (4.3,4.5, sep2.1". Probably requires a 6" telescope to split this pair of white stars. Larger apertures may shown them as yellowish.
ψ^1 ds. (4.5,10.8, sep 49.6"). Medium power reveals a wide pair of orange stars.
centre. Begins to resolve in apertures greater than 10".
94 ds. (5.3,7.2, sep 12"). Fine pale red/pale green.
NGC6981 (**M72**) (9.3) gc. A distant cluster. Rather loose concentration and difficult to resolve.
NGC6994 (**M73)** (8.9). Asterism of 4 stars. Identify for curiosity to add to your Messier collection.
NGC7009 (8.3) pn. The "Saturn Nebula". Fine blue/green oval object in moderate aperture telescopes. Larger apertures reveal the faint antennae and hence the name. The Central star is visible in 16" telescopes.
NGC7089 (**M2**) (6.5) gc. Showpiece object! Bright compressed halo with bright core.
NGC 7293 (6.5) pn. The "Helix Nebula". RA 22h 29.6m Dec -20^o 29.6m. It is possibly the nearest planetary nebula to us and hence its large angular size of 770". However it requires a dark site when binoculars/low power on a small telescope should reveal its ghostly outline.
NGC7606 (10.8) sg. Faint elongated halo with brighter centre. Stellar nucleus visible in 12"+ apertures.

Capricornus (Cap).

α^1 (4.2) and α^2 (3.6) form a fine "line of sight" yellow double star visible to the naked eye and a fine view in binoculars. α^1 has two physical companions (9.2 and 13.7). α^2 has a magnitude 11 reddish companion.
β (3.4, 6.2 sep. 205"). ds. Deep yellow primary with white secondary situated in rich field of faint stars.
o (6.1, 6.6 sep. 22") ds. A fine double of blue-white and blue stars.
σ (5.5, 9.0 sep. 56") ds. A fine double. Deep yellow primary with pale blue secondary.
NGC7099 (**M30)** (7.5) gc. Fine object unfortunately not well seen from the UK.

Cepheus (Cep).

Delta (δ) Cephei, 3.5 to 4.4 over a period 5.37 days, is the prototype for the Cepheid class of variable stars which because of their period-luminosity relationship has lead them to being used as "standard candles" in measuring distances to nearby galaxies. Pale blue +6.1 companion. Two types of object for the price of one!
Mu (μ) Cephei 3.7 to 5.0 approximate period 755 days is a semi-regular variable star. It is more famous for its striking red colour being fittingly called "Herschel's Garnet Star". It is the reddest naked eye star visible from the northern hemisphere. Its colour may show signs of variability.
Struve (Σ) 2816 ts. (5.7/7.5/7.5, sep 12"/20"). Fine triple with Struve (Σ) 2819 ds (7.4/8.6, sep 13") in same field. All contained in the large, sparse and nebulous open cluster IC 1396!
Struve (Σ) 2840 ds. (5.6/6.4, sep 18". Very fine greenish/bluish pair.
Open clusters - NGC188 (8.1), NGC6939 (7.8), NGC7510 (7.9), NGC7762(10.0).
Planetary Nebula NGC40 (10.7).
Spiral galaxy NGC6946 (8.9) in the same 1degree field as oc NGC6939.
The faint reflection nebula NGC7023 and emission nebula IC 1396 provide a challenge to the observer. A dark clear sky is essential.

Delphinus (Del).

β (4.0, 4.9 sep. 0.3") ds. Visible with a small telescope using high power.
κ (5,1,11.7 sep. 28.8") ts.
γ (4.5,5.5 sep. 9.6") ds. A fine double. Primary yellow, secondary green.
NGC6891 (10.5) pn. RA 20h 10.5m Dec +16^{o} 55m. Central magnitude +12.4 star.
NGC6905 (11.1) pn.
NGC6934 (8.9) gc.
NGC7006 (10.6) gc.

Draco (Dra).

Alpha (α) Thuban. Although only a third magnitude object, 5000 years ago Thuban held the distinction of being the Pole Star. Its designation alpha is strange as it is only the seventh brightest star in the constellation.
Mu (μ) ds. 5.6/5.7; separation 1.9". Pair of white stars.
Nu (ν) ds. 4.9/4.9; separation 61.9". Pair of bright white stars.
Psi (φ) ds. 4.9/6.1; separation 30.3". Pair of yellowish stars.
16 & 17 ds. 5.4/5.5; separation 90.3". Pair of bright white stars.
40 & 41 ds. 5.7/6.1; separation 19.3". Pair of pale yellow stars.
Struve (Σ) 2155 ds. 6.8/10.1; separation 9.8". Pale yellow and blue pair.
NGC4236 (9.6) sg. Seen almost edge and low surface brightness makes it a test for moderate apertures.
NGC4319 (11.9) sg. Elongated haze with prominent core. A Quasar, Makarian 205 (14.5) lies 40" to the south.
NGC5866 (**M102**) lg. Elongated object. One of the "missing" Messier objects.
NGC5907 (10.3) sg. Thin needle of light. A fine edge-on galaxy.
NGC6503 (10.2) sg. Distinctly elongated.
NGC6543 (8.1) pn. The "Cats Eye Nebula". Bright small disc with greenish tint. 11th magnitude central star. Draco's "Showpiece object".

Equuleus (Equ).

The second smallest of the 88 constellations. It contains no notable deep sky objects.
Epsilon (ε) (6.0,7.1 sep 10.7") ds. Pale yellow primary with blue companion giving pleasant contrast. The primary is itself a close double at periastron in 2021. High power may show it as elongated.
Lambda (λ). (7.4, 7.4 sep 2.8") ds. Matched pair of pale yellow stars.
Struve (Σ) 2786 (7.2, 8.3 sep 2.5") ds. Pair of white stars.
Struve (Σ) 2793 (7.8, 8.5 sep 26.6") ds. Yellow primary with blue companion. The primary is an unresolved double.
NGC7015 (11.5) sg. Faint halo with brightening towards the centre.

Lacerta (Lac).

Struve (Σ) 2876 (7.8, 9.3 sep 11.8") ds. Fine blue and white double.
Struve (Σ) 2894 (6.1, 8.3 sep. 15.6") ds. Yellow primary, blue secondary.
Struve (Σ) 2902 (7.6, 8.5 sep. 6.4") ds. Yellow and white double.
8 Lacertae = Struve (Σ) 2922 (5.7, 6.5 sep. 22.4") Multiple star. Brightest four components are white/blueish white. Has been described as a poor open cluster.
O Struve (Σ) 475 (6.8, 10.8 sep. 15.5") ds. White primary with faint blue companion.
BL Lacertae (14 to 17). Prototype for class of quasi-stellar object (QSO).

Pegasus (Peg).

Eta (η) 2.9/9.9 separation 90.4". Binocular object. Yellow and blue components but a telescope is required to see colour of secondary. Herschel's "Pendulum Star" - tap telescope gently for the effect.

Pi^{-1}/Pi^{-2} (π^{-1}/π^{-2}) 5.6/4.3 separation 7'). Fine binocular object. Pi^{-1} is a multiple system with 4 companions of 10^{th} to 12^{th} magnitude.

57 Pegasi. 5.1/9.7 separation 32.6". Beautiful orange primary with a blue companion.

51 Pegasi (5.5). The first Exoplanet was discovered orbiting around this star in 1995.

NGC7078 (**M15)** (6.3) gc, Superb object!

NGC7331 (9.5) sg. Seen almost edge on. Supernova in the summer of 2025.

About half a degree south is the fascinating group of galaxies "Stephan's Quintet". The brightest member of the group is NGC7320 (12.7).

Many happy hours can be spent wandering around "The Square" to locate many moderately bright galaxies. Use a star atlas such as the excellent "Sky Atlas 2000", "Stellarium" or similar software to plan your journey.

P.V.H.