

“ $\Omega > 1$ ”

“Sky-Notes” of the Open University Astronomy Club.

October 2021.

I begin this issue with the sad news that Tim Walker passed away on 12th September. I have been friends with Tim for fifty years when we both worked in BT (then Post Office Telephones). Our first contact was when I had a call asking if we could meet and look at my telescope as he was becoming interested in astronomy. Our careers and interests then became linked and later we attended many evening classes and conventions related to astronomy and geology. It was at an evening class that we first met Barrie Jones, Bob Lambourne and Alan Cooper. Barrie and Bob encouraged us to study the S281 Astronomy and Planetary Science course as associate students. A few years later we studied the S236 Geology course.

Tim and I became key members of a small group led by Andrew Norton in the revival of the OU Astronomy Club in the early nineties. Meetings were held in the ground floor room of the George Abell Observatory prior to its refurbishment. It was at these meetings that the current format for meetings was adopted i.e. Main Speaker, “Sky-Notes” and “Space News”. Tim took on the latter and for many years presented them in a thoroughly researched manner.

When Andrew received authority and finance for the refurbishment of the Observatory he invited us to join him at “Fullerscopes” in Farringdon Road (London) to examine and purchase a 16” Meade Telescope and accessories. Tim and I had the great pleasure of being involved in the purchase of the most expensive item in the showroom without having to sign the cheque!

When the refurbishment of the Observatory was completed Tim and I formed a support team which carried out the testing and alignment of the new 16” telescope. We carried out initial imaging of planets with a Phillips “TouCam” webcam. The first image taken of Saturn still adorns an interior wall.

We carried out an initial inventory of OU and Club equipment together with their storage location.

With increasing commitments of family life Tim handed over the “Space news” and only attended occasional meetings of the Club. His interest in geology and involvement with the Walton Hall branch of the OU Geological Society took priority. Tim was their webmaster until his death. The high quality of the website reflects his expertise in this area. It is noted that this expertise was also used to great effect when he took on the role of Webmaster for the Web Deep-Sky Society.

Tim will be sadly missed but leaves behind many positives and happy memories.

Our sincere sympathies to his wife Diane, son James, daughter Mikaela and their families.

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 they restart, please contact Adrian or myself before the meeting starts.

Forthcoming Meetings.

OUAC Clubnight.

Sadly due to Covid-19 OUAC “Clubnights” are suspended until further notice.

However the situation is improving and we are waiting notification from the OU as to how these can recommence in the not too distant future.

Other Meetings.

A number of organisations are beginning to hold “Normal” in addition to “Virtual” meetings. If you can recommend some please circulate details to OUAC members.

Highlights of the Month.

8th. Mars in Conjunction with the Sun.

9th. Mercury at Inferior Conjunction.

13th. Mars at Opposition.

21st. Peak of Orionid meteor shower.

25th. Mercury at Greatest Western Elongation.

29th. Venus at Greatest Eastern Elongation.

31st British Summer Time ends at 01:00 UT.

31st “Halloween”.

Mercury. Commencing favourable morning apparition mid-month.

Venus. Prominent object low in SW evening twilight.

Mars. Not observable.

Jupiter low in the S to SW evening twilight.

Saturn low in S to SW early evening twilight.

Uranus well placed for nightlong observation.

Neptune well placed for evening through early hour observation.

The **Draconids** meteor shower. See notes below.

The **Orionids** meteor shower. See notes below.

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.

British Summer Time ends at 01:00 (UT) on 31st October. Clocks go BACK one hour!

Aurora.

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

Artificial Satellites.

For details of “Bright Satellite” passes go to the “Heavens Above” website and follow the instructions set-up for your location. Alternatively go to the “spaceweather” website and click the “Flybys” button and follow the instructions to 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	06 ^h 03 ^m	11 ^h 51 ^m	17 ^h 39 ^m
08	06 ^h 15 ^m	11 ^h 49 ^m	17 ^h 23 ^m
15	06 ^h 27 ^m	11 ^h 47 ^m	17 ^h 07 ^m
22	06 ^h 39 ^m	11 ^h 46 ^m	16 ^h 52 ^m
29	06 ^h 52 ^m	11 ^h 45 ^m	16 ^h 39 ^m

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 (expensive!) filters are used. The safest way is the simplest – project the image of the Sun onto grey or white card.

If you can observe in h-alpha where the rewards are much greater.
Solar Cycle 25 is gathering pace.

Keep in touch with the Solar Dynamics Observatory satellite at <http://sdo.gsfc.nasa.gov/>
Add the “Spaceweather” and the “Soho Lasco C3” websites to your “favourite” websites.

The Moon.

Phases:



Produced using "LunarPhase Pro".

New	06 ^d 11 ^h 05 ^m
First quarter	13 ^d 03 ^h 25 ^m
Full	20 ^d 14 ^h 57 ^m
Last quarter	28 ^d 20 ^h 05 ^m

Apsides:

Perigee	08 ^d 17 ^h	Diameter. 33' 23"	Distance. 363,388km.
Apogee	24 ^d 15 ^h	Diameter. 29' 58"	Distance. 405,615km.

Observing.

For northern observers:

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

The Moon 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.

Clear October predawn skies provide excellent opportunities to observe and image the well placed waning gibbous and waning crescent Moon.

On 4th and 5th (very difficult) try locating the very thin crescent Moon E morning twilight **before sunrise**.

On 7th (difficult) & 8th try locating the very thin crescent Moon WSW evening twilight **after sunset**.

If you can take images of the above 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.

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

The Planets.

Mercury.

Inferior Conjunction on 9th.

Then commences a favourable morning apparition for northern observers.

Greatest Elongation W (18.4°) on 25th.

Moon close on N/A.

Date.	Mag.	Dia.	Phase.	Rise.	Transit.	Set.
15	+2.0	9.2"	0.11	05 ^h 26 ^m	11 ^h 06 ^m	16 ^h 46 ^m
25	-0.6	6.8"	0.57	04 ^h 55 ^m	10 ^h 40 ^m	16 ^h 25 ^m
31	-0.8	5.9"	0.78	05 ^h 14 ^m	10 ^h 44 ^m	16 ^h 15 ^m

Venus.

Prominent object low in the SW evening twilight.

1.5° N of Antares on 16th.

Greatest Elongation E (47°) on 29th.

Moon close on 9th.

Date.	Mag.	Dia.	Phase.	Rise.	Transit.	Set.
01	-4.1	19"	0.62	10 ^h 34 ^m	14 ^h 42 ^m	18 ^h 49 ^m
29	-4.4	25"	0.50	11 ^h 37 ^m	14 ^h 59 ^m	18 ^h 48 ^m

Mars.

Not observable.

Conjunction with the Sun on 8th.

Moon close on N/A.

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

Mission details and progress of numerous Orbiters and Landers are on the appropriate websites.

Jupiter.

Prominent object low in S to SW evening to midnight sky.

Moon close on 15th.

Date.	Mag.	Dia.	Rise.	Transit.	Set.
01	-2.7	46"	16 ^h 18 ^m	21 ^h 01 ^m	01 ^h 47 ^m
31	-2.5	42"	14 ^h 19 ^m	19 ^h 02 ^m	23 ^h 45 ^m

Saturn.

West of Jupiter low in the S to SW evening sky.
Moon close on 14th.

Date.	Mag.	Dia.	Rise.	Transit.	Set.
01	+0.5	18"	15 ^h 41 ^m	19 ^h 57 ^m	00 ^h 18 ^m
31	+0.6	17"	13 ^h 43 ^m	18 ^h 00 ^m	22 ^h 17 ^m

Uranus.

Well placed for nightlong observation.
Heading towards **Opposition on 5th November**.
Moon close on 21st.

Date.	Mag.	Dia.	Rise.	Transit.	Set.
01	+5.7	3.7"	18 ^h 37 ^m	02 ^h 05 ^m	09 ^h 36 ^m
31	+5.7	3.8"	16 ^h 37 ^m	00 ^h 06 ^m	07 ^h 32 ^m

Neptune.

Well placed for evening to “early hour” observation.
Moon close on 17th.

Date.	Mag.	Dia.	Rise.	Transit.	Set.
01	+7.8	2.4"	17 ^h 09 ^m	22 ^h 48 ^m	04 ^h 32 ^m
31	+7.8	2.3"	15 ^h 10 ^m	20 ^h 48 ^m	02 ^h 30 ^m

At mag +13.5 Neptune’s largest satellite, Triton, provides a good challenge for 8” telescopes under favourable sky conditions and when Triton 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 E and W elongations.

Dwarf Planets.

Ceres. A 8th mag object located in Taurus east of the Aldebaran. The gap narrows throughout the month so worth taking a series of images throughout the month.

Eris (2003 UB313). A mag +18.7 target located in Cetus. At Opposition on 17th.

Haumea. A mag +17.3 CCD target located in Boötes. Becoming lost in WNW evening twilight.

MakeMake. A mag +17 CCD target in Coma Berenices.

Pluto. Mag +14.3 object located in Sagittarius low in the S to SW evening sky.

Asteroids. (Approx Mag +10.5 or brighter).

Vesta (4).	Not observable.
Harmonia (40).	Located Cetus. Mag +9.4 at opposition on 1 st .
Phocaea (25).	Located in Pisces. Mag +10.1 at opposition on 19 th .

Charts and details of selected asteroids are available at:

http://britastro.org/computing/charts_asteroid.html

See also the *BAA Handbook*, monthly periodicals and the “Heavens above” website.

Comets.

No “bright” comets at present.

Charts and details of selected comets are available at:

http://britastro.org/computing/charts_comet.html

See also the *BAA Handbook*, monthly periodicals and the “Heavens above” website.

Meteor Showers.

The **Draconids** are active from 6th to 10th with peak activity on 9th, ZHR = 25. Little interference from Moonlight. This shower occasionally produces major outbursts.

The **Orionids** are active from 16th to 30th with **peak activity on 21st**, ZHR = 25.

Moonlight interferes!

The **Taurids** are active from 20th October to 30th November with two peaks in November. The shower can produce bright fireballs so worth keeping your eyes out.

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 details and updates.

Eclipses.

No Lunar or Solar Eclipses this month.

2. Deep Sky.

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. pn = planetary nebula.

en = emission nebula. rn = reflection nebula. sg = spiral galaxy.

eg = elliptical galaxy. lg = lenticular galaxy. ir = irregular galaxy.

pg = peculiar galaxy. snr = super nova remnant. ly = light year.

The magnitude of an object, excluding double, triple, multiple and variable stars, is shown in brackets e.g. (6.5).

All magnitudes are + unless otherwise shown.

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”. Minima for “night owls” occur on 8^d 23.0^h, 11^d 19.8^h and 31^d 21.5^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.

Gamma And. See notes below.

Zeta Aqr. See notes below.

94 Aqr. See notes below.

Alpha Cas. See notes below.

Iota Cas. See notes below.

Eta Cas. See notes below.

Sigma Cas. See notes below.

Delta Cep. See notes below.

Struve (Σ) 2816 & 2819 Cep. See notes below.

Struve (Σ) 2840 Cep. 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.

Zeta Psc. See notes below.

35 Psc. See notes below.

51Psc. See notes below.

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

Andromeda (And).

Gamma (γ) (2.2, 5.1) is a fine double star. The brighter component is golden-yellow with its companion a greenish-blue. Arguably second only to Albiro in Cygnus.

NGC205 (**M110**) (8.0) eg. A satellite galaxy of M31 visible as an elongated "smudge" in small telescopes.

NGC221 (**M32**) (8.2) eg. A satellite galaxy of M31. Visible as a fuzzy star in small telescopes.

NGC224 (**M31**) (3.5) sg. The Great Andromeda Spiral Nebula. Increasing aperture reveals more and more detail although increasingly smaller areas of the galaxy fill the eyepiece. 8" telescopes should reveal NGC206 as a hazy patch. It is a large area of star formation. 12" scopes will reveal one or two of M31's large population of globular clusters.

NGC404 (11.9) lg. Located 6' NW of β And. The 2nd magnitude star tends to drown the faint glow of the galaxy. Use high power to push the star out of the field of view for best results.

NGC752 (5.7) oc This large open cluster is located about 4 degrees south of γ .

NGC891 (10.1) sg. Located about 3 degrees east of γ is seen almost edge on. Bright central bulge. Moderate apertures will reveal a narrow dust lane bisecting the long axis. A fine object.

NGC7640 (12.5) sg. Seen nearly edge-on.

NGC7662 (8.6) pn. "The Blue Snowball". Rather small making it difficult to distinguish from nearby faint stars. High magnification on an 8" telescope will reveal an elliptical ring with a dark centre. Large apertures will show a faint second outer ring of nebulosity and the 13th magnitude central star.

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 sep 2.1"). Probably requires a 6" telescope to split this pair of white. Larger scopes may show 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 your Messier collection.

NGC7009 (8.3) pn "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 "Helix Nebula". RA 22h 29.6m Dec -20° 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 even binoculars/low power small telescope should reveal its ghostly outline.

NGC7606 (10.8) sg. Faint elongated halo with brighter centre. Stellar nucleus visible in 12"+ apertures.

Cassiopeia (Cas).

Alpha (α) (2.2/8.9 sep. 64.4'') ds. Fine orange and blue pair. Part of a multiple system.

Iota (ι) (4.6/6.9/8.4 sep. AB 2.5'', AC 7.2'') ts. Beautiful white, yellow and blue triple system.

Eta (η) (3.4/7.5 sep. 12.9'') ds. Superb gold and garnet pair. The colours are very subjective. What do you see?

Sigma (σ) (5.0/7.1 sep. 3.0'') ds. Bluish white and yellow pair in a superb field.

NGC129 (6.5) oc.

NGC147 (9.3) eg. A satellite galaxy of M31.

NGC185 (9.2) eg. A satellite galaxy of M31.

NGC278 (10.9) eg. Located a few degrees SE of NGC185.

NGC457 (6.4) oc.

NGC581 (M103) (7.4) oc. Fine object.

NGC7654 (M52) (6.9) oc. Fine rich cluster.

NGC7789 (6.7) oc.

IC1805 (6.5) oc.

IC1848 (6.5) oc.

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 one degree field as open cluster NGC6939.

The faint reflection nebula NGC7023 and emission nebula IC 1396 provide a challenge to the observer. A dark clear sky is essential.

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 sep 90.4'') ds. Binocular object. Yellow and blue components but telescope required to see colour of secondary. Herschel's "Pendulum Star" - tap telescope gentle for the effect.

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

57 Pegasi. (5.1/9.7 sep 32.6'') ds. Beautiful orange primary with blue companion.

NGC7078 (**M15**) (6.3) gc superb object.

NGC7331 (9.5) sg. Seen almost edge on.

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" to plan your journey.

Pisces (Psc).

Alpha (α) (4.2/5.1 sep.1.5'') ds. Requires a large aperture telescope using high magnification to split this pair of bluish-white stars.

Zeta (ζ) (5.6/6.2 sep. 23'') ds. Fine white and yellow pair of stars.

35 (6.0/7.6 sep 7.6'') ds. Fine yellow and blue pair.

51 (5.7/9.5 sep.27.5'') ds. Glorious bluish and greenish pair of stars.

65 (6.3/6.3 sep 4.4'') ds. Fine matched pair of pale yellow stars.

Wolf 28 (12.3). Van Maanen's Star. One of the few white dwarf stars visible in amateur telescopes.

NGC128 (11.8) sg. Brightest of a group of five galaxies.

NGC488 (10.3) sg. Elongated halo with brighter core.

NGC628 (**M74**) (9.4) sg. Seen face on and hence low surface brightness.

NGC7541 (11.7) sg. Elongated oval with bright core. 3' to the SW is NGC7537 (13.0).

Pisces Austrinus (Psa).

Alpha (1.2) Formalhaut. The most southerly first magnitude star visible from the UK. A young star encircled by a disc of gas and dust indicating planetary formation.

P.V.H.