MAG NEWS

DIARY DATES (information to be confirmed where not shown)

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Title</th>
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<tbody>
<tr>
<td>July 13th, 7.30pm</td>
<td>Spaceguard Centre</td>
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<td>August 10th, 7.30pm</td>
<td>Spaceguard Centre</td>
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<td>September 14th, 7.30pm</td>
<td>Spaceguard Centre</td>
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Forthcoming Meetings

MAG meetings are held on the second Friday of each month, starting at 7.30pm in the lecture room of the Spaceguard Centre, Llanshay Lane, Knighton, Powys. Everyone interested in astronomy regardless of age or ability is welcome to attend.

CALLING ALL MEMBERS!

The newsletter is available for members at no charge for your want-ads and for sale items. Inserts of any description for news, comments, questions or observations would be most welcome. The editor Neil Walters can be contacted at ncwalters76@gmail.com, and the secretary Helen Gooderham at hgooderham29@gmail.com.

GENERAL

Times given in the Newsletter (except Diary Dates and TV programmes) are UT (GMT beginning at midnight) throughout.

Sunrise and Sunset 52.34°

<table>
<thead>
<tr>
<th></th>
<th>Jul 15</th>
<th>Jul 23</th>
<th>Jul 31</th>
<th>Aug 8</th>
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<tr>
<td>Date</td>
<td>04.09;</td>
<td>04.20;</td>
<td>04.32;</td>
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<td>20.16</td>
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Phases of the Moon

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<th>Time</th>
<th>(Rise)</th>
<th>(Set)</th>
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<td>Jul 13</td>
<td>02.49</td>
<td>04.27</td>
<td>20.50</td>
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<tr>
<td>First Quarter</td>
<td>Jul 19</td>
<td>19.53</td>
<td>12.18</td>
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<td>Full</td>
<td>Jul 27</td>
<td>20.22</td>
<td>20.05</td>
<td>03.54</td>
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<td>Last Quarter</td>
<td>Aug 4</td>
<td>18.19</td>
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Anniversaries

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WHAT’S UP?  (JUN/JUL)

The Moon

Perigees occur on Jul 13 at 08.30 and Aug 10 at 18.06. In the first instance the distance is 357,431 km and the apparent angular diameter is 33’13”. In the second the distance is 358,082 km and the apparent angular diameter is 33’08”. Apogee occurs on Jul 27 at 05.45. The distance is 406,222 km and the apparent angular diameter is 29’33”.

There is a total lunar eclipse on Jul 27. From the UK the eclipse will already be total at moonrise, which is at 20.05 in Knighton. Totality ends about an hour after this, and the penumbral phase (effectively the end of the eclipse) about two hours later. This will be the longest lunar eclipse this century, since the moon is at apogee and therefore moving at its relatively slowest pace.

The Planets

Mercury

Now a difficult evening object, low and east of Venus.

Venus

Still a brilliant evening object and well placed in the early part of this period but heading south.

Mars

Mars reaches opposition on Jul 27 and is the closest it has been for fifteen years. It is brilliant at magnitude –2.8 but unfortunately rather low in Capricornus.

Jupiter

This planet is a prominent evening object in Libra, easily accessible in the first part of this period.

Saturn

Saturn is low among the stars in Sagittarius, having reached opposition in late June. Well displayed but not ideally placed for UK observers.

Uranus and Neptune

Uranus is a morning object on the Aries/Pisces boundary. Neptune is visible after midnight among the stars of Aquarius.

Others

Dwarf Planet (3) Vesta is theoretically a naked eye object at magnitude 5.5 in Ophiuchus.
Deep Sky
This is obviously not the best time of year for deep sky observation, with conditions never technically being darker than astronomical twilight. However, it is the only time from our latitudes that we can look at a reasonable hour towards the galactic centre, which lies in Sagittarius. An adjacent constellation, also rich with interesting objects, is Scorpius, the Scorpion. Although rather low in the south, it is easily located by its first magnitude red star Antares, (α Scorpia). This is an M-type supergiant of about 16 solar masses and 800 solar radii, which means that if placed at the centre of our Solar System its limits would extend between Mars and Jupiter. It is 600 light-years away and has a visual luminosity about 10,000 times that of the Sun. but maybe 60,000 times in total (the “bolometric” luminosity) since much of its radiation is in the infrared. It has a magnitude 5.4 companion at a separation of 3.0”.

Another double close by is β Scorpii, which comprises two young, luminous B-type stars magnitudes 2.6 and 4.9 separated by 13.6”, making it easy for small telescopes. A couple of degrees to the east of this lies the multiple star system ν Scorpii. In a small telescope it shows as a pair, magnitudes 4.2 and 6.1, separated by 41”. Larger apertures show the brighter to be itself a double, magnitudes 4.6 and 5.2, separated by 1.2”. The globular cluster M4 (shown above right) is probably the closest globular the earth at a distance of 6,500 light-years. It is somewhat loose and uncondensed for an object of its type and at magnitude 5.8 it is theoretically visible to the naked eye, though its elevation at our latitudes probably makes this unlikely. However, even a small telescope will resolve it into individual stars. M4 is very close to Antares, and it was first reported by Chesaux in 1746. Somewhat brighter at magnitude 4.2 is the open cluster M6 (shown above left). This is also known as the “Butterfly Cluster” for fairly obvious reasons. It comprises about a hundred faint stars spread across a fairly wide area. It is 1600 light-years distant and about 12 light-years in diameter. M6 is found in the scorpion’s “sting” and so is rather low on the horizon, rising little more than 6° at most. Closeby but a couple of degrees lower still is M7 (shown right). This is the most southerly of the Messier objects. It is brighter at magnitude 3.3 and comprises about 80 stars of magnitude 10 or higher. It is spread over a relatively large area, more than twice that of M6, and is bright enough in more southerly climes to have been known in antiquity. M7 is about 800 light-years away, 20 light-years in diameter and 220 million years old. The globular cluster M80 (shown below left) is not far from M4. Although somewhat less bright at magnitude 7.3, it is probably easier to spot in binoculars since it is rather more compact and concentrated, as well as being a few degrees farther north in the scorpions “head”. It is 28,000 light-years away and was discovered by Messier in 1781. The planetary nebula NGC 6302 (shown right) is also known as the “Bug Nebula”. This is a degree or so lower than M7, and so would be very difficult to observe from the UK except in very good conditions, especially at magnitude 12.8. It is, however, interesting in that it has a very complex structure, and the central white dwarf of 0.64 solar masses is one of the hottest known stars, having a temperature in the region of 200,000K. There are many more interesting objects in this constellation but most are in the scorpion’s tail which is far south and unavailable from UK latitudes.
FOURTH DIMENSION? ............. by Kieran Richmond.

I was in the SU bar when I bumped into someone I'd been trying to avoid. He'd lank greasy hair, bleary eyes and could have used a shave. For a moment I thought it was me in the mirror.

'Hey Kieran! Tell me; what do you say to a media studies grad on his first day's renumerated work?'

'No idea,' I said. 'But I've a horrible feeling I'm about to find out – and soon.'

'You say,' he tried recalling the punchline, 'Big Mac and Fries to go please.'

'Ha, bloody ha,' I groaned. 'At least I know it's renumerated – m before n!' I bought my beer and slipped outside. I admired the starry sky but, alas, I'd been followed.

'Didn't buy a pint for your buddy, did you?'

'You didn't buy one for me either.'

'Can't afford to - but it doesn't mean I ain't thirsty.'

'Tap water in your digs is free.'

'Kieran; I've designed a spaceship so freaking fast that ordinary people could be taking vacations on exoplanets soon. It will make me millions - while you're stuck flipping burgers at Micky-Dee's.'

'To sell that idea, you will need to buy drinks - for anyone who'll listen,' I said. 'Even at one-fifth light speed, you'd need to leave now for Proxima Centauri – to be there and back in your lifetime!'

'One has to kick off somewhere,' he said, rolling a spliff.

'True,' I agreed, 'but today's rockets are dinosaurs. We're going nowhere until we ditch our primitive fixation with 3D travel. Yesterday's science-fiction must become tomorrow's science fact.'

'What have you been on?'

'Something better than that rubbish you smoke,' I said. 'You got a pen on you?'

He nodded. I gestured towards a window where a square of light shone out. I pulled an outdated poster from the wall and flipped it over: 'Draw me a square.'

He drew a square – it was wobbly but then he was sky high on weed.

'Okay, now let's go 3D - draw me a see-through cube.'

He drew his cube. It sagged like a cardboard box in a rain-storm. I re-drew it for him.

'You've drawn a hexagon, Kieran?'

'It gets better,' I answered. I drew lines linking the opposite corners so all three crossed at dead centre. 'Now, how many pointy corners on a cube?'

He took another tug on his spliff: 'Eight, isn't it? It's got to be!' Then he looked at my snowflake-in-hexagon rendition again. 'But I can only see six.'

'The line you can't see is there but you're looking straight down it - a central dot, a fourth dimension that's been there all along, the nearest and furthest corners of the cube merged into one.'

'That's cheating!' he protested. 'You're still in a 3D space – governed by X, Y and Z rules!'

'X, Y and Z are man-made concepts. Space-time is curved and who said all axes must be perpendicular anyway? Abolish that notion and there are your four dimensions in a cube, corner to opposite corner, all equally valid yet as long or short as you see them. Thinking outside the box is what will take you to the stars, not megatons more fuel! The fourth dimension even has its own letter – W.'

So have you – for... Hey, man, all this philosophy is doing my head in!'

'I've told you before - it's that dubious dope you buy from the Dodgy Don!'

'I'm hungry,' he said. 'Join me for a burger at Micky-Dee's?' ☺

Meteors

The α-Cygnids peak on Jul 21 with a ZHR of 5. This weak shower is said to produce steady activity throughout the northern summer. The Capricornids peak on Jul 9, 16, and 26, in each case with a ZHR of about 5. These are said to be bright yellow-blue meteors, said to be favourable this year in the first half of July. The δ-Aquarids peak on Jul 29 and Aug 6 with ZHR 20 and 10 respectively, but the meteors tend to be faint and the radiants are rather far south.
Dark Skies Presteigne
Leigh Harling-Bowen

On the 18th July 2018 I shall be presenting a proposal to Presteigne and Norton Town Council to apply to the International Dark-Sky Association to make Presteigne a Dark Sky Community. Potentially this would have both economic and environmental benefits for the Town. If the Council approve this proposal then the application process, which takes typically between eighteen months and two years, can start.

I have proposed that the management of the application process and subsequent management of the Dark Sky Community is undertaken jointly by volunteers from Marches Astronomy Group and Transition Presteigne.

The process is to survey the lighting in Presteigne and produce an action plan that reduces light pollution, but at the same time maintains a safe environment. This will produce several lighting projects which can be developed as the application process proceeds. At the same time, the quality of the night sky needs to be monitored (as a baseline), so that we have quantitative evidence of improvement. This is done using a Light Quality Meter, which will be purchased by Transition Presteigne.

If the proposal is approved by The Council and you would like to be involved with this interesting project, then email me at taylorsfarmhouse@gmail.com I'll look forward to hearing from you.

ASTRONOMY AND SPACE NEWS

Kepler-186f is the first identified earth-sized exoplanet orbiting in the habitable zone around its host star. This means that liquid water could pool on its surface, but other factors are important if life is to evolve. In particular, the axial tilt, and its variation with time, determines the changing seasons and how light from the host star strikes the planetary surface. A new study suggests that the axial tilt of Kepler-186f is very stable, much like that of Earth, making it likely that this exoplanet has regular seasons and a stable climate. Discovered in 2014, Kepler-186f is slightly larger in radius than the Earth and orbits its host in 130 days. It is 557 light-years away in the constellation of Cygnus.

Jul 2. First Image of Newborn Planet.
Astronomers using SPHERE, the advanced planet-hunting instrument on ESO’s Very Large Telescope, have captured the first confirmed image of a planet in the act of formation in the dusty disc encircling a young star designated PDS 70. The planet, named according to the accepted convention PDS 70b, can be seen clearly carving a path through the planet forming material. To view the image and for further information simply google PDS 70.

Using data from ESA’s Gaia satellite, astronomers have plotted the unusual paths of some stars in our Milky Way galaxy, which are highly eccentric, causing them to be dubbed the “Gaia Sausage”. Computation indicates that these are the result of a collision between our galaxy and a smaller one (which has inevitably become the “Sausage Galaxy”) between 8 and 10 billion years ago. This would have had a mass of about 10 billion times the mass of the Sun, and would itself have been totally destroyed in structure by the interaction, causing considerable disruption to the core of the Milky Way. Although numerous dwarf galaxies have been devoured by our galaxy in its lifetime, this would have been the largest collision of them all.