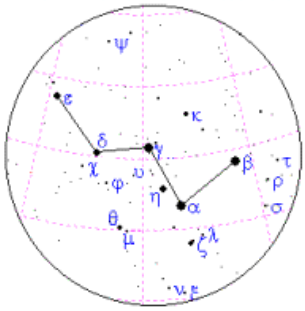


Wadhurst Astronomical Society Newsletter FEBRUARY 2016

2016 SUBSCRIPTIONS

Subscriptions to the Wadhurst Astronomical Society become due from the 1st of January 2016. They remain at £16 per adult member and £23 for two members at the same address.

Subscriptions can be paid either by cheque made payable to Wadhurst Astronomical Society or as cash at the meetings or by post to:
John Wayte
Members Secretary
Wadhurst Astronomical Society
27 Pellings Farm Close
Crowborough
East Sussex
TN6 2BF

The Subscriptions can also be paid via electronic banking to:
Wadhurst Astronomical Society
Account Number **35104139**
Sort Code **60-22-15**
Putting your name as the **Reference** so we know who is paying.

MEETINGS

JANUARY MEETING

After welcoming Members and visitors to a well-attended meeting, Phil Berry handed over to the Chairman, John Vale-Taylor for the start of the Society's Annual General Meeting.

John began by saying that he wished to thank Mike Wyles who has been our Treasurer and Membership Secretary for many years but has sadly had to resign from the Committee and the Society on health grounds. He also thanked Paul Treadaway who is also leaving the Committee because his hours of work make it difficult but will continue to be a useful member of the Society.

Our new Treasurer, John Lutkin who took over at short notice gave a note of the Society's accounts, saying that our Current Account presently stands at £802.01 and the Reserve Account has a balance of £502.92. Since last year, we have had to move the location of our meetings from the Church Rooms across the road to our present venue at Uplands College. Inevitably the cost of hiring the room has increased and this may mean the Society needs to increase subscriptions slightly in 2017.

John Wayte has taken over as Membership Secretary and said that this year our badges have changed from blue to pink. He has produced a new membership application form for prospective members but said it contained quite a bit about the Society such as contact details and any member was welcome to take one just for information.

Phil Berry is the Society Secretary and spoke of the success of talks during the past year and mentioned talks we can expect in the coming year which appear on the website.

John Vale-Taylor then said that he was retiring as Chairman after 9 very enjoyable years. He is involved in a lot of local activities and projects and wants to spend more time on one of his new interests in macro photography, photographing butterflies and following their life cycle. During his time as our Chairman he and Phil have encouraged more members to give a talk, which helps the Society. He feels this is a friendly and well-informed astronomical society as he hands over to our new Chairman, Brian Mills.

As our new Chairman, the first task Brian had to do was to ask if members were happy to support the existing Committee, which was confirmed unanimously. Then he asked if any Member was willing to come on to the Committee that meets four times a year and if so to contact any member of the Committee. Fresh ideas are very welcome.

Brian then thanked John Vale-Taylor for being a calming and guiding influence on the Committee and for his general attitude to his responsibilities. In recognition of this he said the Committee had agreed on behalf of members to make John a Life Member of the Society and presented him with a framed certificate.

Retiring Chairman John Vale-Taylor receiving his certificate of Life Membership of the Society from our new Chairman, Brian Mills

Next, Eric Gibson, one of the Committee members announced that he was in touch with the Mullard Space Science Centre just south of Dorking with regard to a visit by the Society. We would need to take our cars and park there. The Centre needs to have some idea of numbers and Eric asked for a show of hands and about 20 members indicated their interest. Eric will now go back to Mullard to see what they can offer during March, April or May which could be a mid-week visit. Final numbers will be needed shortly but there is still time to think about it.

Phil now introduced our speaker for the evening, our own Ian King who has worked with telescopes for very many years and now runs his own company, Ian King Imaging.

Traditional Refracting Telescopes
Ian King

In outlining his talk, Ian told us that most people in the street would define an astronomical telescope as a long tube with a refracting lens at one end and an eyepiece to view an object at the other and looking like a traditional telescope. Nearly all of the object lenses are made up of Crown glass and Flint glass in an attempt to bring various colours into the same focal point.

A traditional telescope

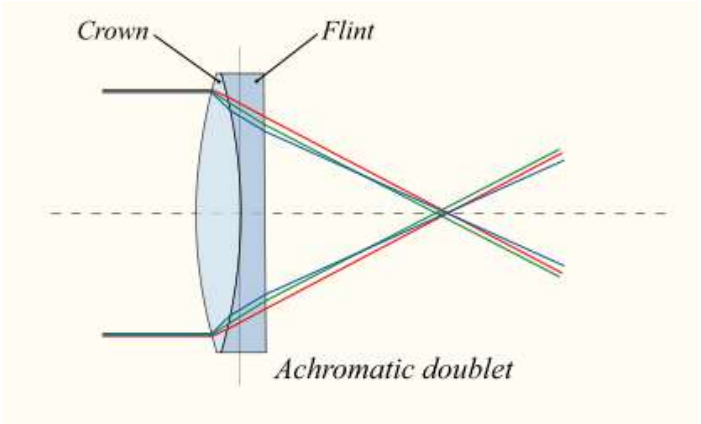


Diagram of the doublet lens

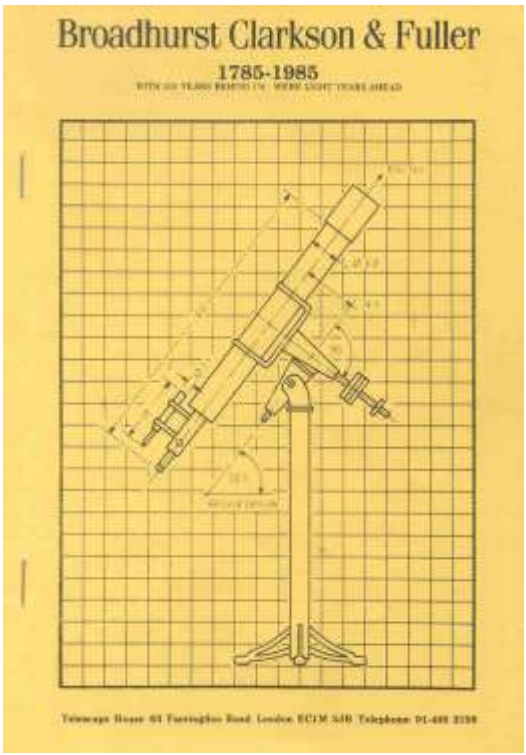
The traditional white tube with a big refracting lens was what first excited Ian into his interest in telescopes at an early age, although he said that telescopes now are manufactured with much shorter focal lengths for portability and fast optics for use in astro photography. They now use very accurately made lenses, telescope often having as many as five elements which produce less distortion and sharp images.

But back in the 60s and 70s some of the traditional telescopes were being made using Japanese lenses and were excellent, particularly for planetary work.

Ian related the story from when he was 15 and his first telescope, bought much against his father's advice for £15 which turned out to be an utter disaster as an astronomical scope. His father took pity on him and bought him a Tasco 60 mm refractor which now resolved craters on the Moon and some detail on the planets. This was followed by a 4-inch Newtonian which Ian never liked.

But then at the age of 16 he managed to save enough money to buy a Carlton 60 mm refractor which was so good he could see clearly the rings on Jupiter and even their structure.

Ian began his career working for 13 years at Telescope House, formerly Broadhurst, Clarkson and Fuller which many remember was in Farringdon Road, London and run by Dudley Fuller who sadly died last year. The firm became Telescope House and moved to Tunbridge Wells. Ian showed a catalogue which had hardly changed since the 60s but was full of nostalgia. Sadly, the firm has now been bought out by a German company and now trades as Telescope House Bresser (UK) severing a link that stretches back over 200 years.



An early catalogue

Telescope House in Farringdon Road after moving to Kent but the start of many an amateur's dream

We looked back to Hans Lipperhey who Ian said is largely credited with inventing the telescope although at the time others were working on them as well. The telescope was basically a convex spherical lens that collected and concentrated the light to a concave lens eyepiece at the focus point. There were severe chromatic aberrations and he found that by using a long focal length of forty or fifty inches or more these aberrations seemed less apparent and this is why very old telescopes had such long tubes.

Around 1733 a number of opticians were working on combination lenses and John Dolland produced an achromatic lens made up of two types of glass, flint and crown, in one combined lens with roughly opposite dispersion which considerably reduce chromatic aberration and meant telescopes could be made with much shorter focal lengths with much less aberration.

Ian said that in 1814 Joseph Fraunhofer improved on Dolland's design producing telescopes that could then be used in observatories. Telescopes could be made with lenses up to 40-inches in diameter before the glass began to distort under its own weight.

To limit chromatic aberration to an acceptable amount in an achromatic telescope a formula was devised called the Sidgwick Formula which states that as long as the focal length is greater than 2.88 x its aperture in inches squared it will not be a factor. As an example a 4-inch refractor's focal length would need to be greater than 46-inches giving a focal ration (focal length/aperture) of F11.5. This shows why older telescopes were so long. It was pointed out that there is an even more stringent formula called the Conrady formula.

One of the advantages of long focal lengths is that the zone of focus is much greater and Ian also said that eyepieces don't have to be so demanding.

We then looked at various 20th Century Japanese telescope manufacturers such as Towa, Tasco, Pentax and many others. Ian said that in the 1950s Japanese telescopes began to appear on the market with one of the earliest under the name Unitron and showed an advertisement of what looked like a very exciting 3-inch telescope for an amateur in those days with, we were told, very good optics. Many others began to appear and the Japanese soon established themselves as serious telescope manufacturers.

Many of these telescopes are still sought after today although the buyer would probably replace the focuser and mount which Ian said are so much better these days.

We were shown an early Celestron telescope and were told that they were made by Vixen in Japan but were then rebranded.

Finally Ian looked at telescopes he would suggest were worth considering if one wanted to buy a traditional achromat, particularly mentioning the Altair Starwave 102 4-inch.

Altair Starwave 102 4-inch F 11

Some of the many traditional telescopes Ian had brought to the meeting

An enjoyable, informative and for some a nostalgic talk.

FEBRUARY MEETING

Wednesday 17th February 2016 – Melanie Davies tells us about "Cassini-Huygens: A Journey to Saturn"

This meeting will take place in the Drama Studio at Uplands Community College. The address is: The Drama Studio, Uplands Community College, Lower High Street, Wadhurst TN5 6AZ and is through the gates and on the left.

Meetings begin at 1930 although members are invited to arrive anytime after 1900 as this is a good time to exchange ideas and discuss problems and also help set things up before the meeting starts.

Anyone is welcome but non-members are asked if they wouldn't mind contributing £3 towards costs.

FUTURE MEETINGS

Wednesday 16th March 2016 – The entertaining Dr. David Mannion updates us on "The Search for Dark Matter and Dark Energy"

SKY NOTES FOR FEBRUARY 2015

Planets

Mercury is a morning object at the start of the month, and reaches greatest western elongation on 7th February. However, it is poorly placed as seen from the UK being only 4° above the south eastern horizon at the beginning of civil twilight as shown in fig 1. Venus is close by and may act as an aid to locating the smallest planet. Mercury then moves back towards the Sun although it doesn't reach superior conjunction until the end of March.

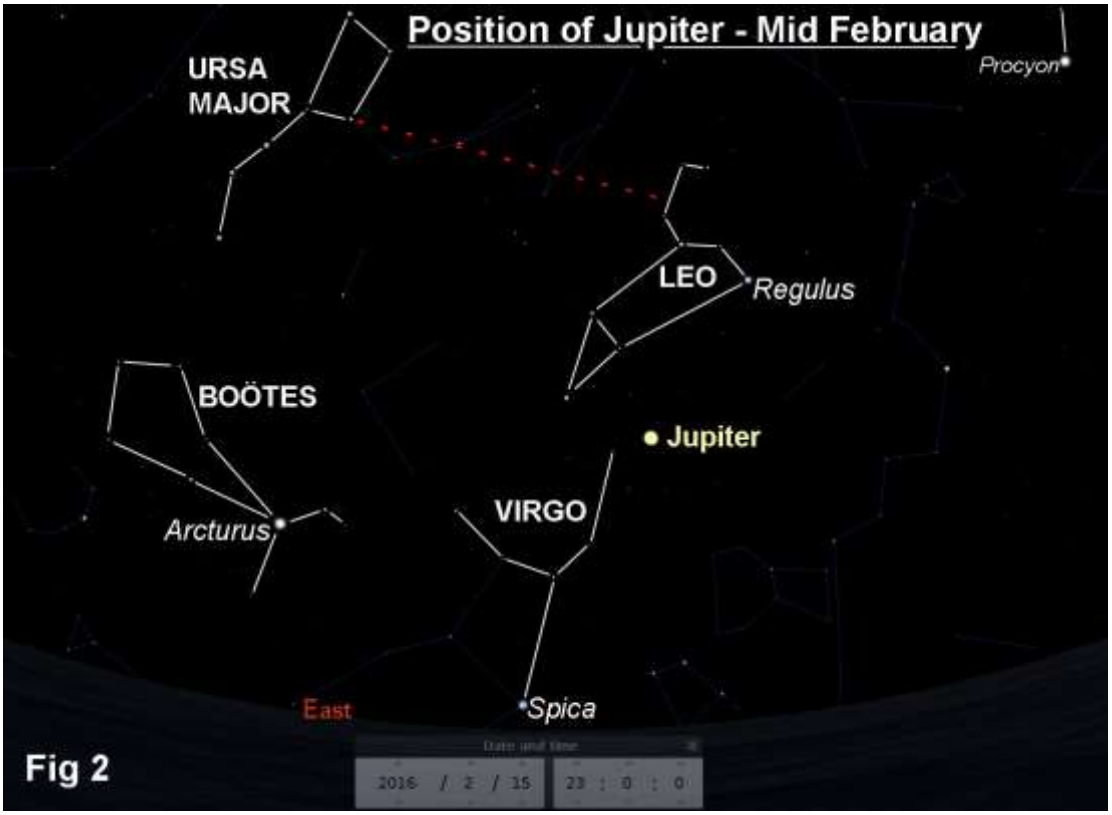
Considering its size though, Mercury punches well above its weight when talking in terms of setting records. Firstly it is, of course, the planet closest to the Sun although despite its position there it is not the hottest. This honour belongs to Venus because, although it is further away, it has dense clouds that cause a greenhouse effect. Secondly, not only is it the smallest of the Sun's planetary family being only 4,880 km in diameter but two planets (Jupiter and Saturn) have moons that are larger than Mercury. Thirdly, the tilt of Mercury's axis of rotation is the smallest of the eight planets within the solar system at just two arc minutes, which is about one thirtieth of a degree. This means that the planet doesn't experience seasons in the same way that we do on Earth where the axial tilt is 23½ degrees. Lastly, if that wasn't enough, Mercury also has the most eccentric orbit of the eight causing its distance from the Sun to vary between 46 and 70 million kilometres.

To live on Mercury would be a strange experience indeed because it's rotation is very close to being tidally locked to the Sun, so in the time that the planet has taken to orbit the Sun twice, it will have only rotated on its axis three times.

Venus has passed its best and is moving towards a superior conjunction in early June. Despite that it is still a brilliant morning object, though it is low down in the south east. It rises 3 hours ahead of the Sun at the start of the month, but by the end this has shrunk to just an hour and a half. Fig 1 gives the planets position on the 7th.

Mars is still a morning object, rising at 01.30 at the beginning of February and transiting due south at 06.00. This is shown graphically in fig 3. The red planet spends the month moving direct in Libra as its brightness and apparent size both increase. This process will continue until May when it reaches opposition on the 22nd in the constellation of Scorpio. The Moon, just past last quarter, will be less than three degrees north of mars on 1st February.

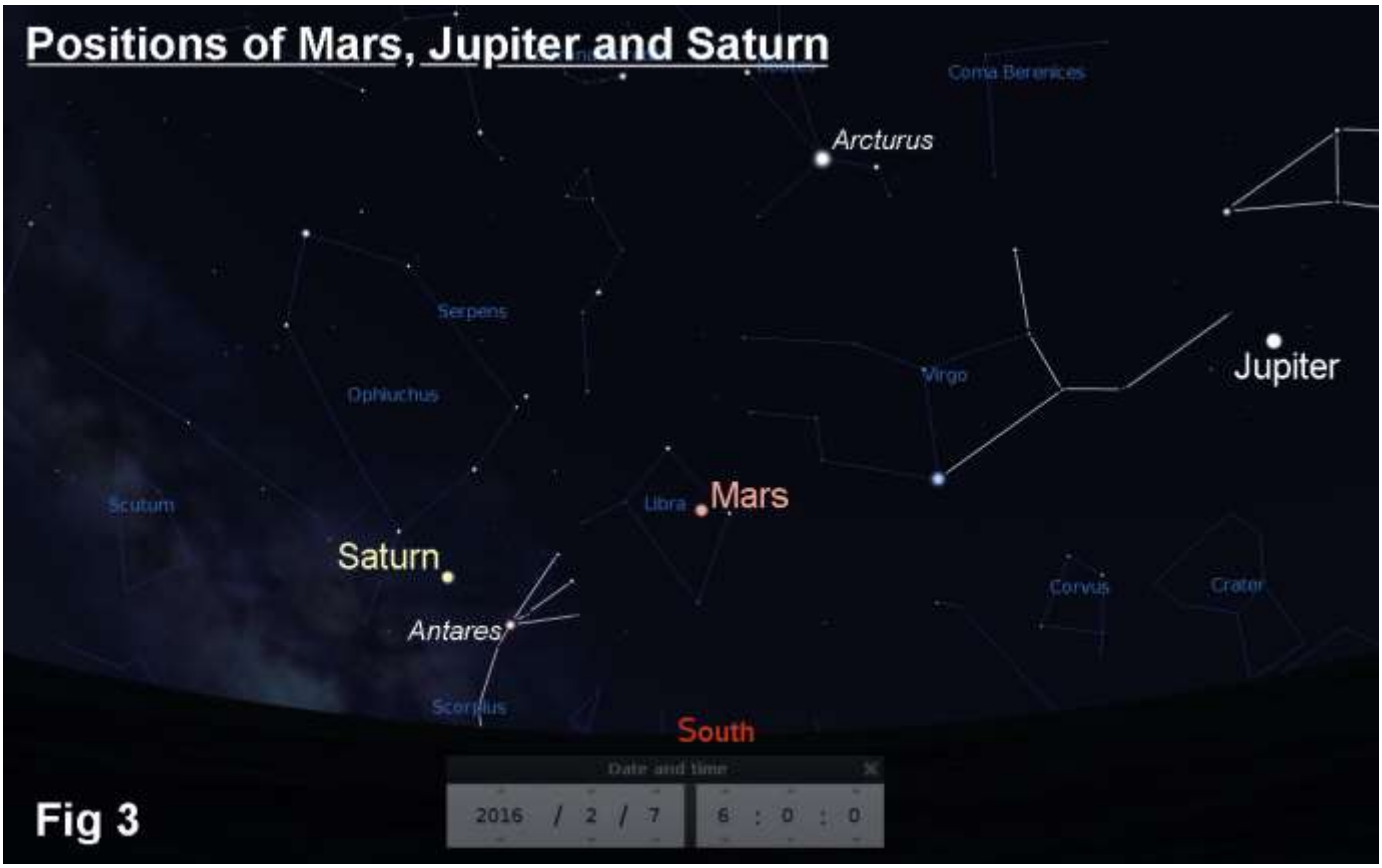
Jupiter is now a brilliant evening object rising at 20.30 on the first of the month and culminating at 02.45. In early January it reached its first stationary point on the border with Virgo and since then has been moving retrograde, back the way it came, through Leo. By the end of February it rises at 18.15, meaning that it crosses the meridian due south at 00.45. It will reach opposition on 8th March when it will be visible throughout the hours of darkness. The gas giant's size and magnitude are almost at maximum now, so it is an ideal time to look at the planet with whatever optical aid you have. Binoculars, providing they are supported, will show the four largest moons and even small telescopes will provide a hint at the cloud belts.



To find Jupiter use the map at fig 2. If you are not familiar with this area of the sky, start by finding the plough which is to the east of the meridian and climbing. Use the two rear stars in the bucket of the plough and draw an imaginary line through them and extend it away from the pole and to the east (your right). This will bring you to a group of stars that resemble a back to front question mark.

This is the “sickle” of Leo and forms the head of the mythological lion. The rest of the constellation can be easily identified, and Jupiter can be found just below the hind quarters of the lion. I have included Jupiter in fig 3 as well to show its position relative to the other planets in the pre dawn skies. This clearly shows the line of the ecliptic, which is the apparent path of the Sun and planets across the sky. It can equally be described as the plane in which the Earth and other planets orbit around the Sun.

Saturn is also a morning object, rising at 04.00 at the start of the month. It is currently moving direct in Ophiuchus and will in fact, to the dismay of astrologers, remain there until late February next year. Saturn’s brightness remains steady at +0.5 whilst its angular size increases very slightly to 16.5" (16.5 arc seconds). The ringed planet will reach opposition in early June though it will not be as favourable as in recent years as it will attain a maximum altitude of just over 18°. Its current position in the early morning skies is shown in fig 3.



Lunar Occultations

In the table below I’ve listed events for stars down to magnitude 7.0 that occur before midnight although there are many others that are either of fainter stars or occur at more unsociable hours. DD = **d**isappearance at the **d**ark limb whilst RD = **r**eappearance at the **d**ark limb. The column headed “mm” (millimetres) shows the minimum aperture telescope required for each event. **Times are in GMT.**

Feb.	Time	Star	Mag	Ph	Alt °	% illum.	mm
10th	17.32	ZC3437	6.8	DD	18	6	80
13th	19.28	ZC 327	4.4	DD	35	33	40
15th	20.11	ZC 608	6.0	DD	48	56	40
16th	00.11	ZC 626	6.3	DD	15	57	60
19th	22.50	ZC 1197	5.8	DD	53	92	60
21st	17.45	ZC 1409	5.0	DD	12	99	60

Phases of the Moon for February

Last ¼	New	First ¼	Full
1st	8th	15th	22nd

ISS

Below are details for passes of the International Space Station (ISS) that occur before midnight and are magnitude **-**2.0 or brighter. The details of all passes, including those visible after midnight, can be found at www.heavens-above.com. Please remember that the times and directions shown below are for when the ISS is at it's ***maximum*** elevation, so you should go out and look at least five minutes beforehand. **Times are in GMT.**

Feb.	Time	Mag.	Alt°	Az.		Feb.	Time	Mag.	Alt°	Az.
4th	19.07	-2.1	34	SSW		11th	17.41	-3.3	87	N
5th	18.15	-2.2	30	SSE		11th	19.17	-3.1	66	W
6th	18.57	-3.4	69	SSE		12th	18.24	-3.4	80	N
7th	18.03	-2.9	48	SSE		13th	19.06	-3.3	68	SSW
8th	18.46	-3.5	89	NNW		14th	18.12	-3.4	87	SSW
9th	17.52	-3.3	73	SSE		15th	18.55	-2.5	44	SSW
9th	19.28	-2.1	42	WNW		16th	18.01	-3.0	64	SSW
10th	18.35	-3.4	79	N		18th	17.50	-2.1	41	SSW

Iridium Flares

The flares that I've listed are magnitude **-**2.0 or brighter although there are a lot more that are fainter or occur after midnight. If you wish to see a complete list, or obtain timings for somewhere other than Wadhurst, go to www.heavens-above.com . Remember that when one of these events is due, it is sometimes possible to see the satellite before and after the "flare" although, of course, it will be much fainter at those times. The events of the 24th and 25th, with a brightness of -8.2, should be spectacular if also brief. This is about as bright as Iridium flares can get, and is much brighter than Venus at maximum brilliance. **Times are in GMT.**

Feb.	Time	Mag.	Alt°	Az.°		Feb.	Time	Mag.	Alt°	Az.°
1st	16.58	-5.9	21	216 (SW)		16th	18.50	-3.4	45	20 (NNE)
2nd	18.02	-5.2	12	288 (WNW)		23rd	18.16	-5.6	58	17 (NNE)
3rd	17.47	-4.8	14	284 (WNW)		24th	18.10	-8.2	59	18 (NNE)
4th	17.32	-3.0	17	281 (W)		25th	18.05	-8.2	61	17 (NNE)
4th	18.06	-2.0	40	179 (S)		25th	20.11	-3.9	16	8 (N)
5th	16.53	-5.2	17	225 (SW)		26th	20.05	-2.6	20	8 (N)
5th	17.17	-4.3	19	278 (W)		28th	19.52	-3.3	25	10 (N)
9th	19.25	-5.6	32	18 (NNE)						

The Night Sky in February (Written for 22.00hrs GMT mid month)

In the north, Ursa Major on the east side of the meridian, continues to climb towards the zenith. Below it lies its smaller sibling along with the dragon that winds between them. The fact that some of the summer groups are starting to appear on the horizon can be taken as a sign that better weather is soon to come. Deneb, in Cygnus, and Vega, in Lyra are both just visible and next to them Hercules is just rising. To the west of the meridian we find Cassiopeia and Cepheus, and below them the small and faint constellation of Lacerta, the lizard that contains the open cluster NGC 7243 otherwise known as Caldwell 16.

Turning to the east we find that the bright star Arcturus is at an altitude of 10°, whilst above it are the faint groups of stars that form Coma Berenices and Canes Venatici. According to mythology the latter represents the hunting dogs that Boötes, the herdsman, is holding. The brightest star, Cor Caroli, is a wide double whose components are magnitudes 2.9 and 5.6. The name means "Charles's Heart" although there is some debate about which King Charles it actually refers to. Within the borders of Canes Venatici is M3, the second best globular cluster visible from the northern hemisphere which will need 100 mm aperture at least to begin to resolve individual stars. Coma Berenices is another faint group, but this ones claim to fame is that it contains the north galactic pole within its boundaries. When we look at Coma we are looking out of the galaxy on a line that is perpendicular to the galactic plane. This means there is very little obscuration from gas and dust allowing us to see a large number of galaxies that lie beyond our own. There is also the open cluster Melotte 111, which is more than 5° across, and the globular M53 at magnitude 7.7 which needs a large instrument to resolve it fully.

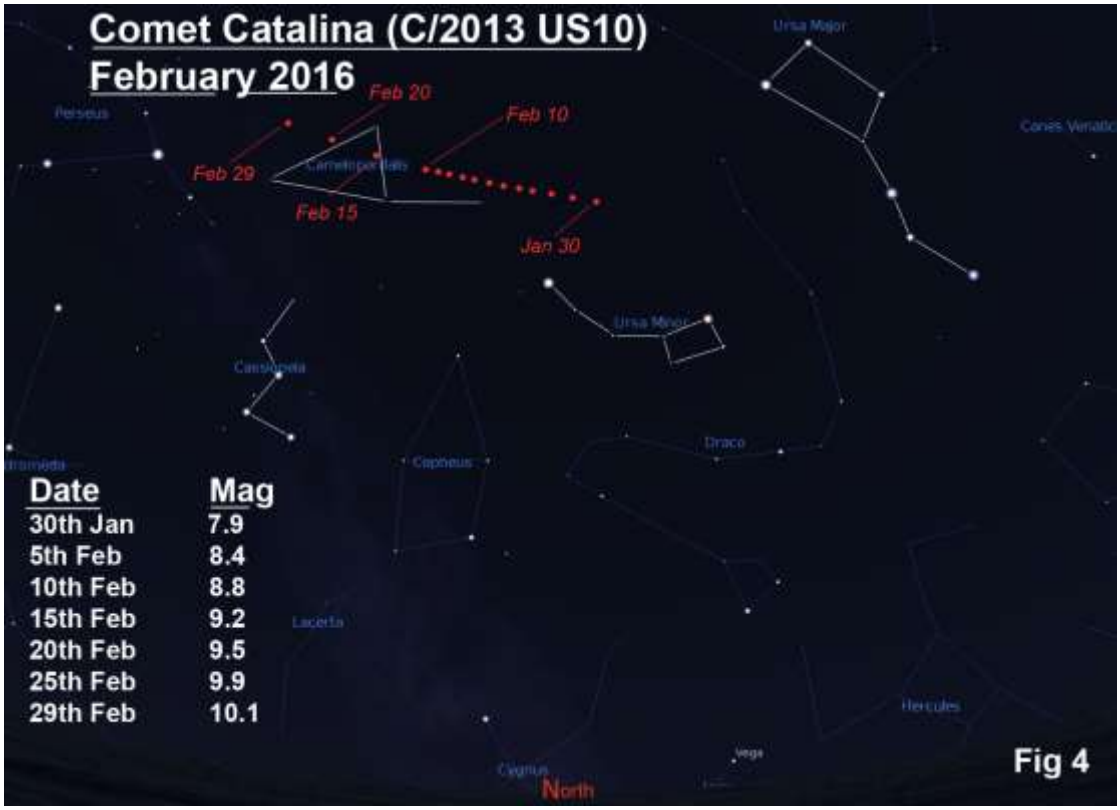
Towards the south, many of the brilliant winter constellations have already culminated leaving the twins in Gemini and Procyon in Canis Minor, on the meridian. If you live somewhere with a good horizon towards the south, now is the time to look for the northern part of Puppis (the poop deck) that lies below Procyon. Despite the fact that the winter groups are mostly past their best they are still prominently positioned if you wish to observe the many jewels in that area. There are a large number of open clusters besides those that get the lion's share of attention like the Pleiades and Hyades. Monoceros has a large number of such objects, many of which like M50, NGC 2232 and NGC 2244 are easily seen in binoculars as is M47 just across the border in Puppis.

In the west Capella shines brilliantly some 65° above the horizon whilst within the confines of Auriga the triplet of open clusters M36, M37 and M38 are at a similar altitude. Below Auriga lies Taurus and Perseus, and in turn below them Triangulum and Aries which will soon be lost to view.

Comet Catalina (C/2013 US10)

This comet was one of the objects found by the Catalina Sky Survey (CSS) which is a program that searches for Comets and asteroids with particular emphasis on Near Earth Asteroids (NEO's) that may pose a threat to the Earth.

The comet is now circumpolar and therefore visible throughout the hours of darkness. Sadly by the time it became visible in the northern hemisphere it was past its best. However, it should be visible early in the month with a reasonably sized pair of binoculars. The map at fig 4 shows its location and gives its magnitude.



Advanced Warning for March
8th March – Jupiter at opposition
9th March – Total solar eclipse visible from Indonesia. There are usually video feeds available on the internet that will allow you to watch the event live.

Brian Mills

SPACEPLACE - NASA

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The Loneliest Galaxy In The Universe
By Ethan Siegel

Our greatest, largest-scale surveys of the universe have given us an unprecedented view of cosmic structure extending for tens of billions of light years. With the combined effects of normal matter, dark matter, dark energy, neutrinos and radiation all affecting how matter clumps, collapses and separates over time, the great cosmic web we see is in tremendous agreement with our best theories: the Big Bang and General Relativity. Yet this understanding was only possible because of the pioneering work of Edwin Hubble, who identified a large number of galaxies outside of our own, correctly measured their distance (following the work of Vesto Slipher's work measuring their redshifts), and discovered the expanding universe.

But what if the Milky Way weren't located in one of the "strands" of the great cosmic web, where galaxies are plentiful and ubiquitous in many different directions? What if, instead, we were located in one of the great "voids" separating the vast majority of galaxies? It would've taken telescopes and imaging technology far more advanced than Hubble had at his disposal to even detect a single galaxy beyond our own, much less dozens, hundreds or millions, like we have today. While the nearest galaxies to us are only a few million light years distant, there are voids so large that a galaxy located at the centre of one might not see another for a hundred times that distance.

While we've readily learned about our place in the universe from observing what's around us, not everyone is as fortunate. In particular, the galaxy MCG+01-02-015 has not a single known galaxy around it for a hundred million light years in all directions. Were you to draw a sphere around the Milky Way with a radius of 100 million light years, we'd find hundreds of thousands of galaxies. But not MCG+01-02-015; it's the loneliest galaxy ever discovered. Our Milky Way, like most galaxies, has been built up by mergers and accretions of many other galaxies over billions of years, having acquired stars and gas from a slew of our former neighbours. But an isolated galaxy like this one has only the matter it was born with to call its own.

Edwin Hubble made his universe-changing discovery using telescope technology from 1917, yet he would have found absolutely zero

other galaxies at all were we situated at MCG+01-02-015's location. The first visible galaxy wouldn't have shown up until we had 1960s-level technology, and who knows if we'd have continued looking? If we were such a lonely galaxy, would we have given up the search, and concluded that our galaxy encompassed all of existence? Or would we have continued peering deeper into the void, eventually discovering our unusual location in a vast, expanding universe? For the inhabitants of the loneliest galaxy, we can only hope that they didn't give up the search, and discovered the entire universe.

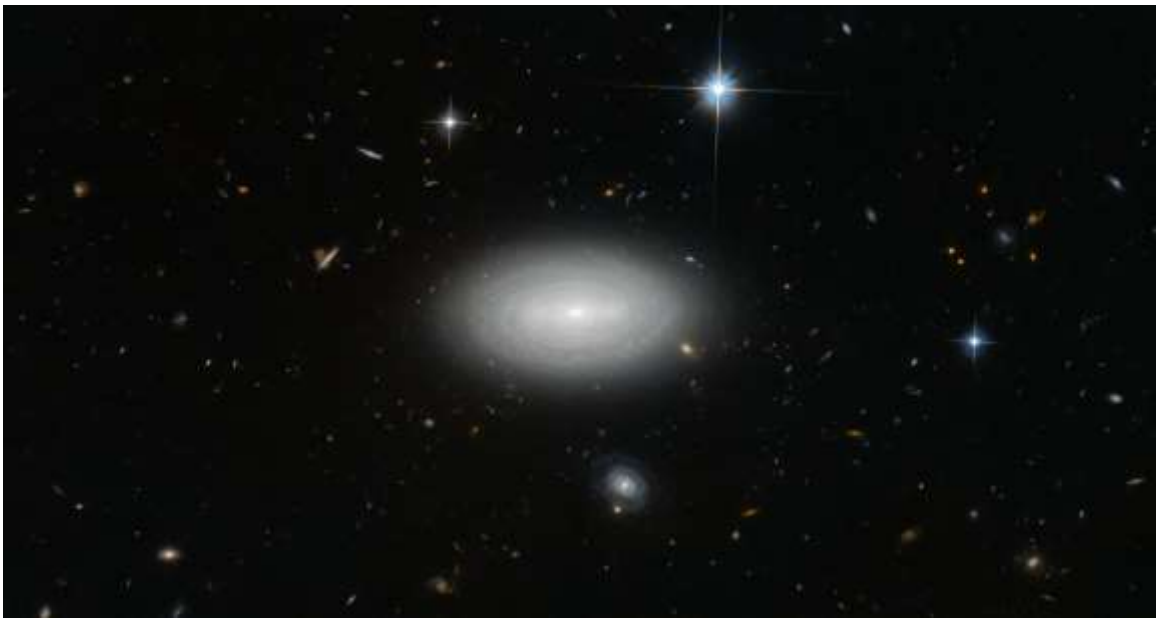

Image credit: ESA/Hubble & NASA and N. Gorin (STScI); Acknowledgement: Judy Schmidt, of the loneliest void galaxy in the known: MCG+01-02-015.

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SAGAS web-site:
www.sagasonline.org.uk

Any material for inclusion in the March 2016 Newsletter should be with the Editor by February 26th 2016