

# Wadhurst Astronomical Society Newsletter NOVEMBER 2015

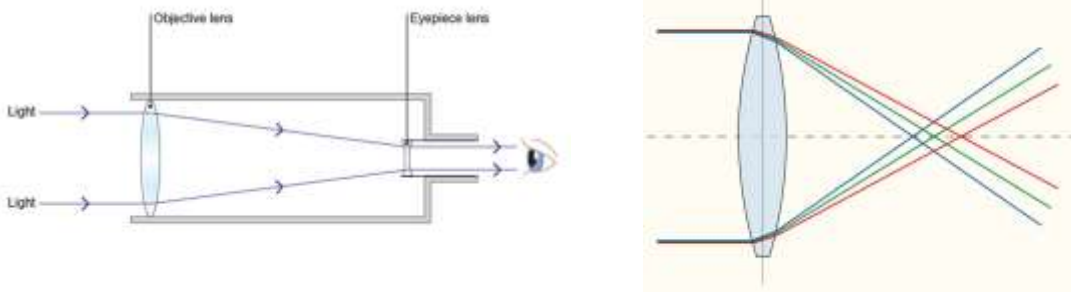
## MEETINGS

### OCTOBER MEETING

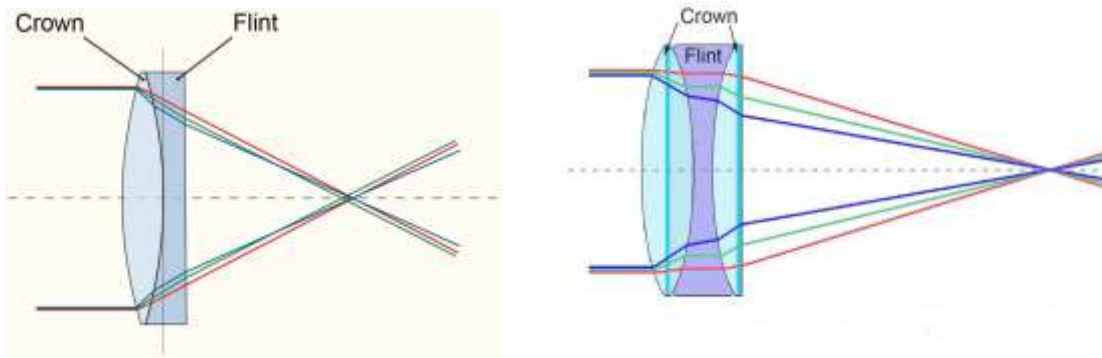
This was the Society's practical evening with the hope of setting up telescopes outside for some viewing but sadly the weather intervened and the meeting had to be held entirely inside.

Brian Mills, our Director of Observations gave a talk where he ran through all the different types of telescopes available and described the way they worked and especially how the various combination of lenses refracted the light and how each type of scope handled this in relation to its focal length to capture as much of the various light bands as possible.

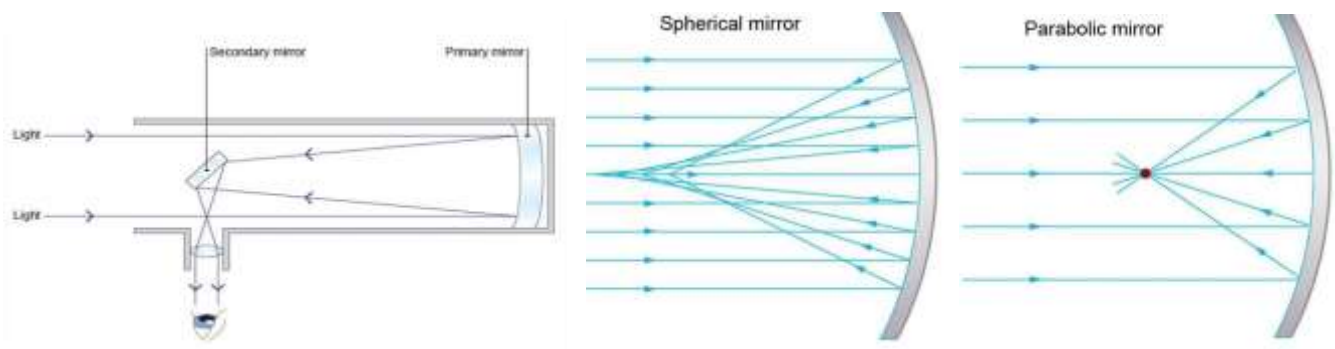
The main telescope that amateurs started with was the refractor and then often moving on to the reflector later. He explained the various types of reflector and the lens combinations used to best effect and covered the history of their development.



The Refracting telescope and demonstrating Chromatic Aberration

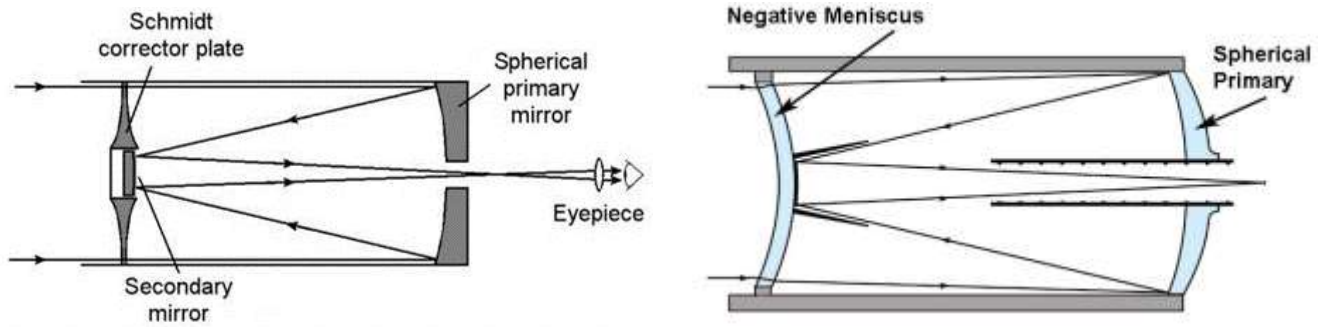


Methods of dealing with chromatic aberration with the Achromat on the left and the Apochromat on the right



Reflecting telescope demonstrating the importance of a parabolic mirror

Brian also talked about other versions of reflecting telescopes.



The Schmidt-Cassegrain is shown on the left and the Maksutov on the right

Phil Berry then explained about the practical application of portable imaging equipment and demonstrated how he used some of his own equipment. He emphasised the importance of stability and how a sturdy tripod was essential. He showed how to use cameras and different lenses with the equipment and demonstrated the use of the sophisticated "Astrotrac" tracking device where the camera is mounted to keep the camera accurately tracking the night sky.

He mentioned that a lot of his equipment had been purchased online via sites such as eBay and how prices could be considerably cheaper than buying in retail shops. He had gained quite a bit of knowledge by reading magazines and various reports in them about the value, reliability and functions of various pieces of equipment before purchasing.

John Vale-Taylor then gave a talk on how, given a smattering of technical knowledge and practical ability, basic "Barn Door" tracking devices could be made for just a few pounds. Some mathematical calculations needed to be made but there are several websites that explain this in detail.



One version of the barn-door tracking device

Eric Gibson then showed a camera given to him on his retirement that could be attached to the eyepiece of a telescope and then linked to a PC that could result in reasonable quality images. The camera could also be controlled by the PC, including a video function, which meant that the use of the camera and manipulation of the images could all be done on the PC with a large screen.

During the refreshment break, attendees were able to look at the various telescopes brought to the meeting and ask questions about how they worked, how to set them up and how to use the attachments present and also had the opportunity of asking questions on the use of their own equipment.

Ian King then gave a presentation about his large refractor telescope which he had brought along to the meeting. He explained that the scope, which dated from the 1970s, was made in Japan and at that time the Japanese had a virtual monopoly on the telescopes sold to the amateur astronomer, resulting in a number of Japanese manufacturers thriving. Gradually, other countries – lately the Chinese – had developed good quality equipment and now there was really only one Japanese manufacturer still operating. Ian's talk was most interesting and knowledgeable and a good prelude to his talk at the January 2016 meeting.

John Wayte gave a brief update on the NASA theories about the presence and location of water on Mars and how it was estimated that when Mars was formed about four billion years ago, (the same time as the Earth was formed), there was enough water to cover the entire Martian surface to a depth of 450 feet!. Gradually this water has been lost to space but the latest data suggests that there

is still enough water to sustain a Martian outpost at sometime in the future. Although John wasn't aware at the time of the meeting, this month's contribution by NASA's SpacePlace which is at the end of the Newsletter, is on the same subject and confirms all that John told us.

At the end of the meeting Brian Mills gave his monthly Sky Notes with information on which planets to observe and what other interesting objects could be viewed in the coming month. The November Sky Notes follow later in the Newsletter.



A number of telescopes at the meeting and used for demonstration

Despite being unable to observe outside, it was felt that the meeting had been a success with thanks to all those who had given the short presentations.

*Jim Cooper*

### **NOVEMBER MEETING**

**Wednesday 18th November** - Jan Drozd talks on the subject of "Astronomy in Art".

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 relax 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 December** - Brian Mills FRAS takes as his theme "What Did Women Ever Do For Astronomy?"

**Wednesday 20<sup>th</sup> January** – A brief AGM of the Society to be followed by a talk to be given by Ian King who talks about his life in telescopes.

### **SKY NOTES FOR NOVEMBER 2015**

#### **Planets**

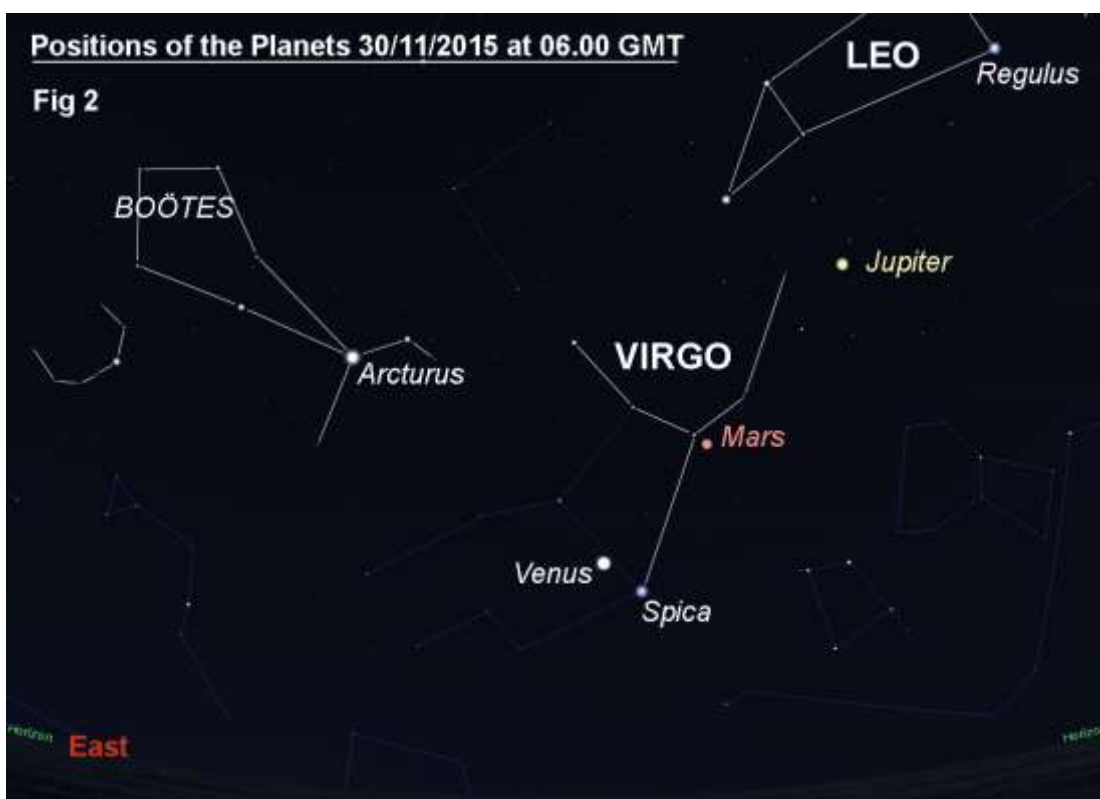
Mercury reaches superior conjunction on the 17<sup>th</sup>, after which it moves east of the Sun to become an evening object. Unfortunately, it is too close to the Sun to be observable this month.

Venus is a brilliant morning object (magnitude -4.3) rising around 03.30 at the start of the month. This is over four hours ahead of the Sun and allows the planet to be seen at its absolute best against a truly dark sky. The amount of Venus illuminated rises from 54% to 67% whilst its angular size drops from 24 to 18 arc seconds. It passes less than one degree south of Mars on the 3<sup>rd</sup> of the month.

Mars, as mentioned above, can be easily located using Venus as a guide on the morning of November 3<sup>rd</sup>. At the start of the month the red planet rises at 02.30 which is 4½ hours ahead of the Sun, although by the end of November this has stretched to 5½ hours

despite Mars itself rising only 15 minutes earlier. The swift eastwards motion of Mars accounts for this discrepancy as it crosses the border from Leo into Virgo early in the month.

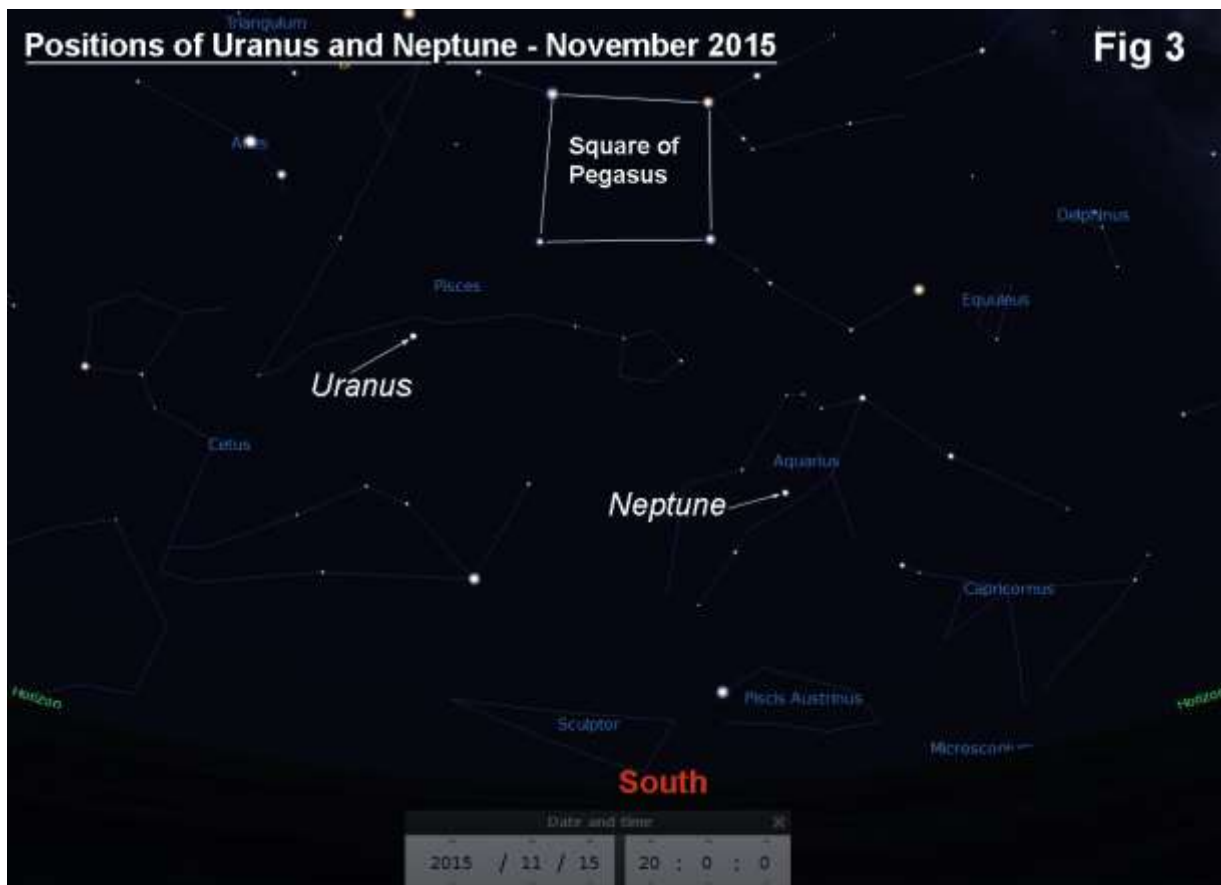
Jupiter is the last of the trio of bright planets to grace the early morning skies, rising 2 hours ahead of Mars as November begins. The gas giant is always the most northerly of the three, though Venus and Mars swap positions early in the month and are thereafter strung out in a line along the ecliptic. See figures 1 and 2 for the positions of the planets at the start and end of the month. On the mornings of the 6<sup>th</sup> and 7<sup>th</sup> the waning crescent Moon joins them for a photo opportunity. By the end of the month Jupiter rises just 30 minutes after midnight so will very soon be back in the evening skies ready for opposition on March 8<sup>th</sup>. This will provide our best views of the planet as it makes its closest approach, which explains its gradual brightening and increase in apparent size. Jupiter is noticeably oblate (flattened at the poles) and at the start of this month measures 33.3 arc seconds around the equator but only 31.1 arc seconds around the poles.



Saturn is technically an evening object at the start of November, setting just over an hour after the Sun. However, in practice, it will be just 4° above the south western horizon at the end of civil twilight so will be a difficult object to locate without an accurate go-to

telescope. The ringed planet passes through solar conjunction on the 30<sup>th</sup> of the month and is therefore lost to view until it re-emerges to the west of the Sun to become a morning object.

Uranus and Neptune are not normally mentioned here but both are visible in the evening skies at the moment. At 20.00 GMT they lie either side of the meridian in the south with altitudes of 40° and 25° respectively. Uranus is the brighter of the two at magnitude 6 whilst Neptune is a little fainter at 7.5. A go-to telescope will locate them for you though you will need a finder chart to be able to identify them from the accompanying stars. If you are using a modest telescope you may be able to observe that Uranus presents a tiny disk rather than a point of light. Another way to locate them would be to use a DSLR camera and take images over a period of a few nights. A comparison of them will reveal that one of the “stars” is moving slowly against the background.



**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 = disappearance at the dark limb whilst RD = reappearance at the dark limb. The column headed “mm” (millimetres) shows the minimum aperture telescope required for each event. **Times are in GMT.**

Nov.	Time	Star	Mag	Ph	Alt °	% illum.	mm
17 <sup>th</sup>	18.15	ZC 2986	6.4	DD	20	33	40
18 <sup>th</sup>	18.44	18 Aquarii	5.5	DD	24	44	40
19 <sup>th</sup>	17.28	ZC 3270	5.8	DD	29	55	40
20 <sup>th</sup>	22.31	ZC 3431	6.6	DD	22	68	70
21 <sup>st</sup>	16.29	ZC 4	6.3	DD	22	76	70
24 <sup>th</sup>	23.45	ZC 464	6.1	DD	51	99	70

**Phases of the Moon for November**

Last ¼	New	First ¼	Full
3 <sup>rd</sup>	11 <sup>th</sup>	19 <sup>th</sup>	25 <sup>th</sup>

**ISS**

Sadly there are no evening passes of the International Space Station this month. There are, however, a number that occur after midnight and through until dawn. If you would like details of these please go to [www.heavens-above.com](http://www.heavens-above.com)

## 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](http://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. **Times are in GMT.**

Nov.	Time	Mag.	Alt°	Az.°		Nov.	Time	Mag.	Alt°	Az.°
4 <sup>th</sup>	16.39	-6.5	29	208 (SSW)		20 <sup>th</sup>	18.32	-7.3	37	147 (SSE)
8 <sup>th</sup>	17.50	-4.2	41	168 (SW)		21 <sup>st</sup>	17.00	-6.8	29	196 (SSW)
9 <sup>th</sup>	16.28	-5.7	21	217 (SW)		24 <sup>th</sup>	16.51	-5.8	25	203 (SSW)
9 <sup>th</sup>	17.44	-3.8	40	171 (S)		24 <sup>th</sup>	18.17	-2.2	37	157 (SSE)
10 <sup>th</sup>	17.22	-5.5	13	286 (WNNW)		25 <sup>th</sup>	18.11	-7.5	36	158 (SSE)
11 <sup>th</sup>	17.07	-3.3	16	284 (WNNW)		27 <sup>th</sup>	16.42	-2.6	21	208 (SSW)
12 <sup>th</sup>	16.52	-5.7	19	281 (W)		29 <sup>th</sup>	16.39	-2.8	18	212 (SSW)
13 <sup>th</sup>	17.30	-3.4	38	178 (S)		29 <sup>th</sup>	17.56	-2.9	35	165 (SSE)
14 <sup>th</sup>	16.31	-4.6	23	278 (W)		30 <sup>th</sup>	17.42	-5.6	12	295 WNW

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

In the west the three bright members of the Summer triangle are still visible though Altair will soon be lost. Cygnus, which now points nose down towards the horizon, contains a number of open clusters of which M 39 (magnitude 4.6) and NGC 6871 (magnitude 5.2) are the brightest. Below Cygnus is a line of small constellations with the most obvious being Delphinus, the dolphin, and Sagitta, the arrow. Despite being quite faint their shapes are distinct and whilst it is possible to imagine the shape of an arrow, it is extremely difficult to see the merest hint of a dolphin!

Turning to the north, the plough is beginning to climb once more which means that on the opposite side of the pole Cepheus is descending. Cepheus lies on the edge of the Milky Way and so contains a number of open clusters, the brightest of which is NGC 7160 at magnitude 6.1. There are also a number of galaxies and nebulae, with the most obvious being the "Elephant's Trunk Nebula" which I mentioned last month. Close to the overhead point lies Cassiopeia and Perseus with the lovely "double cluster" in the sword handle of the latter.

The eastern sky is now dominated by the brilliant winter constellations that make up Orion's retinue although Sirius in Canis Major has yet to rise. The dazzling Capella is 55° in altitude whilst below it are Taurus, Gemini, Orion and Canis Minor. That fine group, the Pleiades are also 55° high and well positioned for DSLR imaging though they are still some way from the meridian.

The south is, by contrast, much less striking with the fainter groups of Eridanus, Pisces and Cetus close to, or on, the meridian. Above them Pegasus and Andromeda are well placed with M31, the most distant object visible to the naked eye, at an altitude of 75° making it an ideal target for the imager.

## Meteors

The Taurids are active from October 20<sup>th</sup> to November 30<sup>th</sup> and are technically two separate showers that both originate from the debris deposited by comet Encke. Both have radiants close together in Taurus with the southern shower peaking on November 5<sup>th</sup> and the northern one reaching maximum on November 12<sup>th</sup>. The meteors produced are slow moving and often bright although the casual observer may not be able to classify which shower out of the two they belong to. The Moon won't cause too many problems although it rises around 01.00 GMT at the time of southern shower maximum. It is new for the peak of the northern shower. See fig 4.

The Leonid shower lasts from November 15<sup>th</sup> to the 20<sup>th</sup> and reaches a very sharp peak at 07.00 GMT on November 18<sup>th</sup>. Watches are most likely to be productive from late on the night of the 17<sup>th</sup> through to dawn although the rate at maximum is predicted to be only around 20. The Moon will be approaching first quarter but will set at 22.45 GMT. See fig 5.

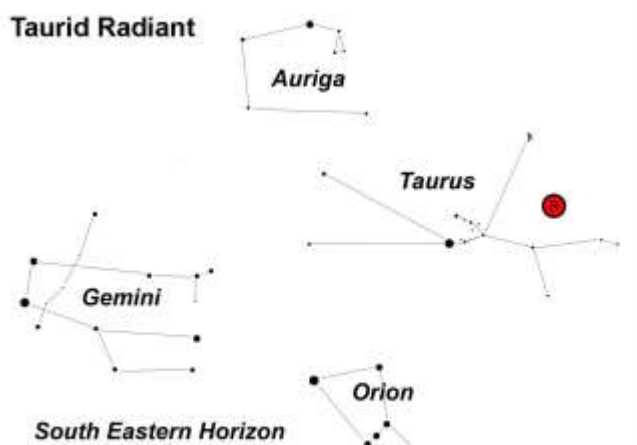


Fig 4

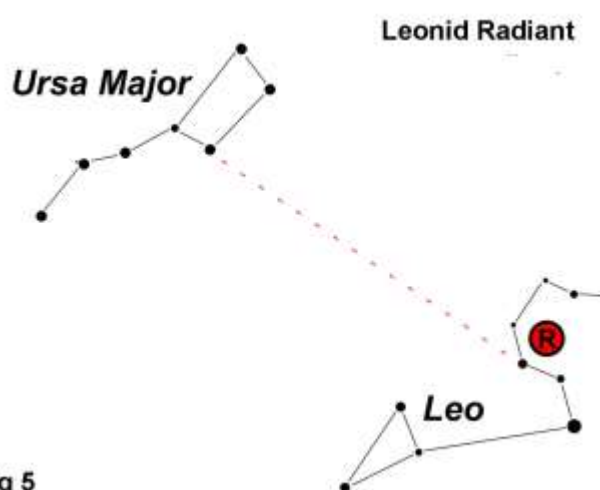


Fig 5

## SPACEPLACE - NASA

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### **How we know Mars has liquid water on its surface**

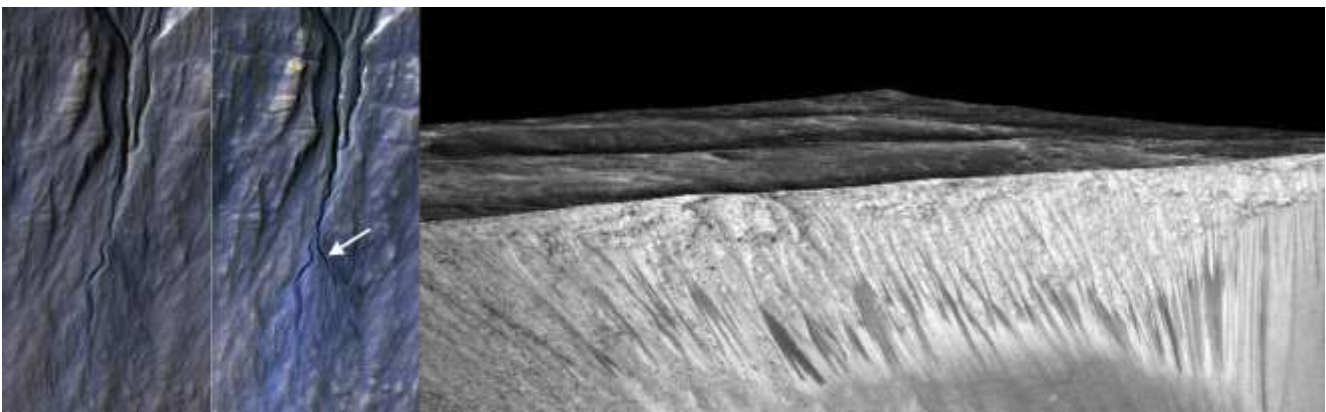
by Ethan Siegel

Of all the planets in the solar system other than our own, Mars is the one place with the most Earth-like past. Geological features on the surface such as dried up riverbeds, sedimentary patterns, mineral spherules nicknamed "blueberries," and evidence of liquid-based erosion all tell the same story: that of a wet, watery past. But although we've found plenty of evidence for molecular water on Mars in the solid (ice) and gaseous (vapour) states, including in icecaps, clouds and subsurface ices exposed (and sublimated) by digging, that in no way meant there'd be water in its liquid phase today.

Sure, water flowed on the surface of Mars during the first billion years of the solar system, perhaps producing an ocean a mile deep, though the ocean presence is still much debated. Given that life on Earth took hold well within that time, it's conceivable that Mars was once a rich, living planet as well. But unlike Earth, Mars is small: small enough that its interior cooled and lost its protective magnetic field, enabling the sun's solar wind to strip its atmosphere away. Without a significant atmosphere, the liquid phase of water became a virtual impossibility, and Mars became the arid world we know it to be today.

But certain ions—potassium, calcium, sodium, magnesium, chloride and fluoride, among others—get left behind when the liquid water disappears, leaving a "salt" residue of mineral salts (that may include table salt, sodium chloride) on the surface. While pure liquid water may not persist at standard Martian pressures and temperatures, extremely salty, briny water can indeed stay in a liquid state for extended periods under the conditions on the Red Planet. It's more of a "sandy crust" like you'd experience on the shore when the tide goes out than the flowing waters we're used to in rivers on Earth, but it means that under the right temperature conditions, liquid water does exist on Mars today, at least in small amounts.

The measured presence and concentration of these salts, found in the dark streaks that come and go on steep crater walls, combined with our knowledge of how water behaves under certain physical and chemical conditions and the observations of changing features on the Martian surface supports the idea that this is the action of liquid water. Short of taking a sample and analyzing it in situ on Mars, this is the best current evidence we have for liquid water on our red neighbour. Next up? Finding out if there are any single-celled organisms hardy enough to survive and thrive under those conditions, possibly even native to Mars itself!



*Images credit: NASA/JPL-Caltech/Univ. of Arizona, of a newly-formed gully on the Martian surface (L) and of the series of gullies where the salt deposits were found (R).*

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**Wadhurst Astronomical Society website:**

[www.wadhurstastro.co.uk](http://www.wadhurstastro.co.uk)

**SAGAS web-site:**

[www.sagasonline.org.uk](http://www.sagasonline.org.uk)

**Any material for inclusion in the December 2015 Newsletter should be with the Editor by November 28<sup>th</sup> 2015**